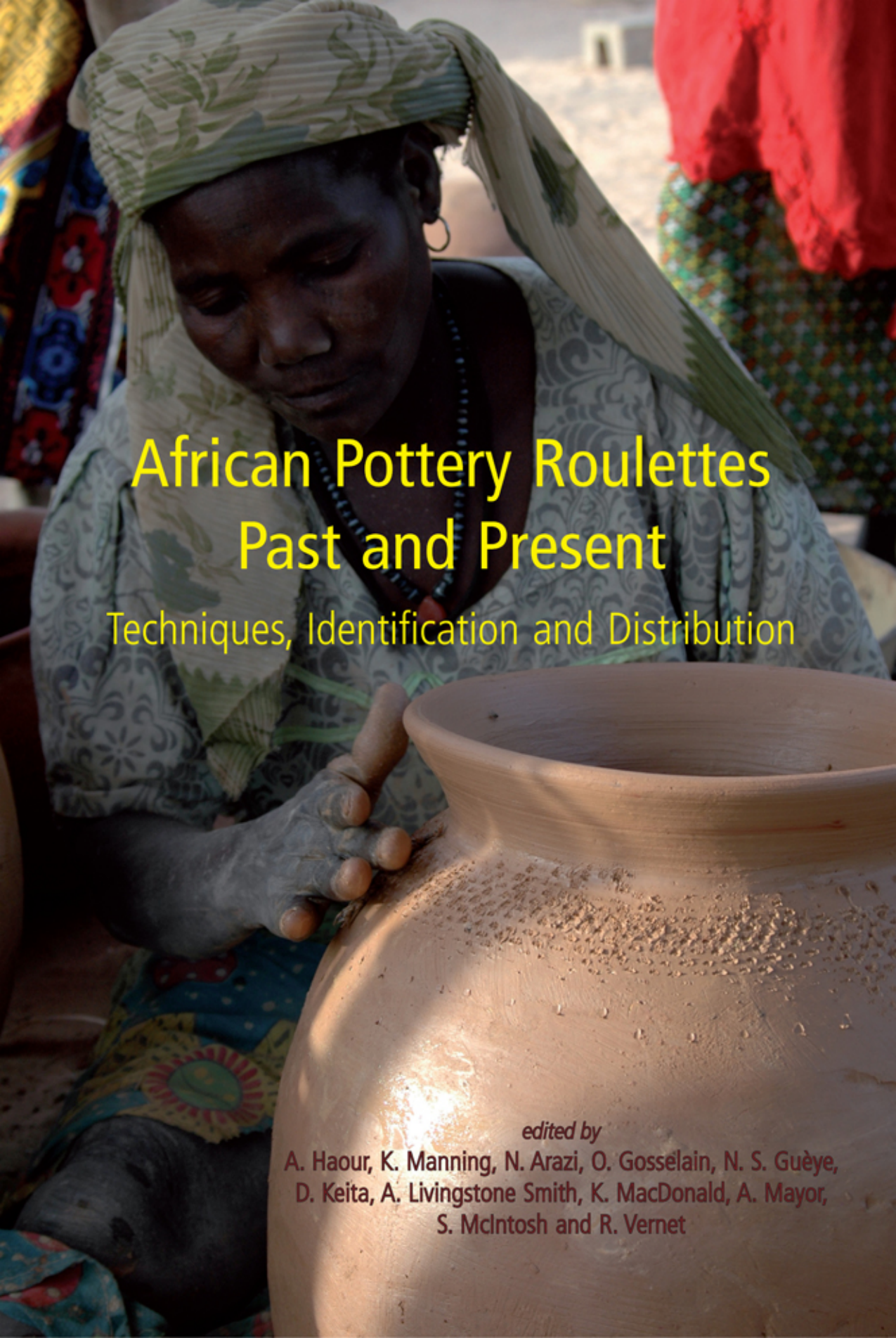

African Pottery Roulettes Past and Present

Techniques, Identification and Distribution

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A. Haour, K. Manning, N. Arazi, O. Gosselain, N. S. Guèye, D. Keita, A. Livingstone Smith, K. MacDonald, A. Mayor, S. McIntosh and R. Vernet

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Font cover: Talata Seyfou Magazi, a Hausa Gobirawa potter from the village of Dan Kasari (southwestern Niger), decorates a water jar with a carved ear of Blepharis linariifolia. (March 2007, © O. Gosselain).
Back cover: A large storage jar is decorated by Karama Ake, Nafona, Burkina Faso, 1996. Photo by A. Livingstone Smith

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Contents

Preface and Acknowledgements

This book issues from the sustained collaboration, over a period of nearly three years, of eleven researchers on three continents, under the title *Making a good impression: pottery of the Sahara-Sahel borderlands*. Neither the book, nor the meetings that enabled its development, could have been achieved without the practical and financial assistance of a range of institutions. We thank the Leverhulme Trust for their grant to Anne Haour of an Academic Collaboration International Network (F/00 204/AI), which funded the two workshops of the research group (in Oxford/London in April 2008, and in Dakar in December 2008), eight studentships, and the salary of Katie Manning as a part-time Network Facilitator. The Sainsbury Research Unit helped meet the cost of publication of the present volume; for this, we thank in particular its Director, Steven Hooper. The patience of Clare Litt, Val Lamb and Tara Evans at Oxbow saw the manuscript to the end.

We are grateful to the museums which made available to our inquisitive examination their collections of roulettes: the Pitt Rivers Museum (and in particular Jeremy Coote, Zena McGreevy, Elin Bornemann and Siân Mundell), the British Museum (and in particular Julie Hudson), and the Institut Fondamental d'Afrique Noire (in particular Ndèye Sokhna Guèye). The possibility of making impressions of some of the holdings at the British Museum and at the Institut Fondamental d'Afrique Noire were very valuable in furthering our understanding. Our hosts at the two workshops, Jeremy Coote, Julie Hudson and Ndèye Sokhna Guèye, enabled the proceedings to run exceptionally smoothly, and we wish too to thank the Institute of Archaeology (University of Oxford), the Musée d'Art Africain of Dakar, and the Chairs of the Dakar sessions: Hamady Bocoum, Mustapha Sall, and Ibrahima Thiaw. We thank Annabelle Gallin, of the *Céramique Africaine Imprimée* network, for joining us in Oxford to make a valuable presentation of that group's closely-related work.

Eight studentships were awarded on a competitive basis within the research project's lifetime. The Oxford meeting was joined by Franziska Barth (then University of Cologne), Bryn James (then University of Manchester), and Ross Thomas (then University of Southampton). The Dakar meeting was joined by Clement Bakinde (Ahmadu Bello University Zaria), Abas Iddrisu (University of Ghana-Legon), Malik Saako (University of Ghana-Legon), Sara Togo (Université de Bamako) and Mammadou Cissé (Rice University). Their enthusiasm gave renewed vigour to discussions, and we hope they will find continued involvement with issues of ceramic analysis in the future.

We thank Joseph Daniels for drawing Maps 1–3 and for his patience in making numerous adjustments to them.

The authors of the Introduction wish to thank Ceri Ashley (University College London), George Lau (Sainsbury Research Unit), Anne Mayor (University of Geneva) and Stephanie Wynne-Jones (University of Bristol) for comments on the English text.

Members of the Making a Good Impression research group in Oxford, April 2008. From left to right. Top row: Robert Vernet, Anne Haour, Olivier Gosselain. Middle row: Kevin MacDonald, Katie Manning, Anne Mayor, Susan McIntosh. Bottom row: Alexandre Livingstone Smith, Ndèye Sokhna Guèye, Franziska Barth, Ross Thomas, Annabelle Gallin and Noemie Arazi.

The translation into French by Anne Haour was much improved by Olivier Gosselain, Ndèye Sokhna Guèye, Daouda Keita, Anne Mayor and Robert Vernet.

In Section 1, we showcase ethnographic material from museum collections. We thank the Trustees of the British Museum for permission to use the images here reproduced as Figures 1.13, 1.16 and 1.18, as well as the Royal Museum for Central Africa (Tervuren, Belgium)/Université Libre de Bruxelles, the Université de Genève, and the Institut Fondamental d'Afrique Noire (Dakar, Senegal) for other images. In addition, we wish to thank Mustapha Sall (Université Cheikh Anta Diop, Dakar) for supplying Figure 1.7, Olivier Langlois (Centre National de la Recherche Scientifique – Centre d'Études Préhistoire, Antiquité, Moyen Âge – UMR 6130) for supplying Figure 1.29, and CL Zvonock for taking some of the photographs. We are also grateful to Anna Craven (independent researcher), Patti Langton (independent researcher), and Barbara Frank (The State University of New York at Stony Brook) for sharing photographs and information on potters and potting tools in West Africa. Finally, we thank Rebecca Miller for making the first translation of the text from French into English.

The author of Section 2 is grateful to the Royal Museum for Central Africa, the Université Libre de Bruxelles, and the Leverhulme Trust for their practical support. He would like to thank Anne Haour and Katie Manning for organising the workshops which led to the present volume and for their infinite patience during the editorial process; and Antoine Leblon for his help with impressions, Anne Mayor for comments on an earlier version of the text in French, and Anne Haour for translating it into English.

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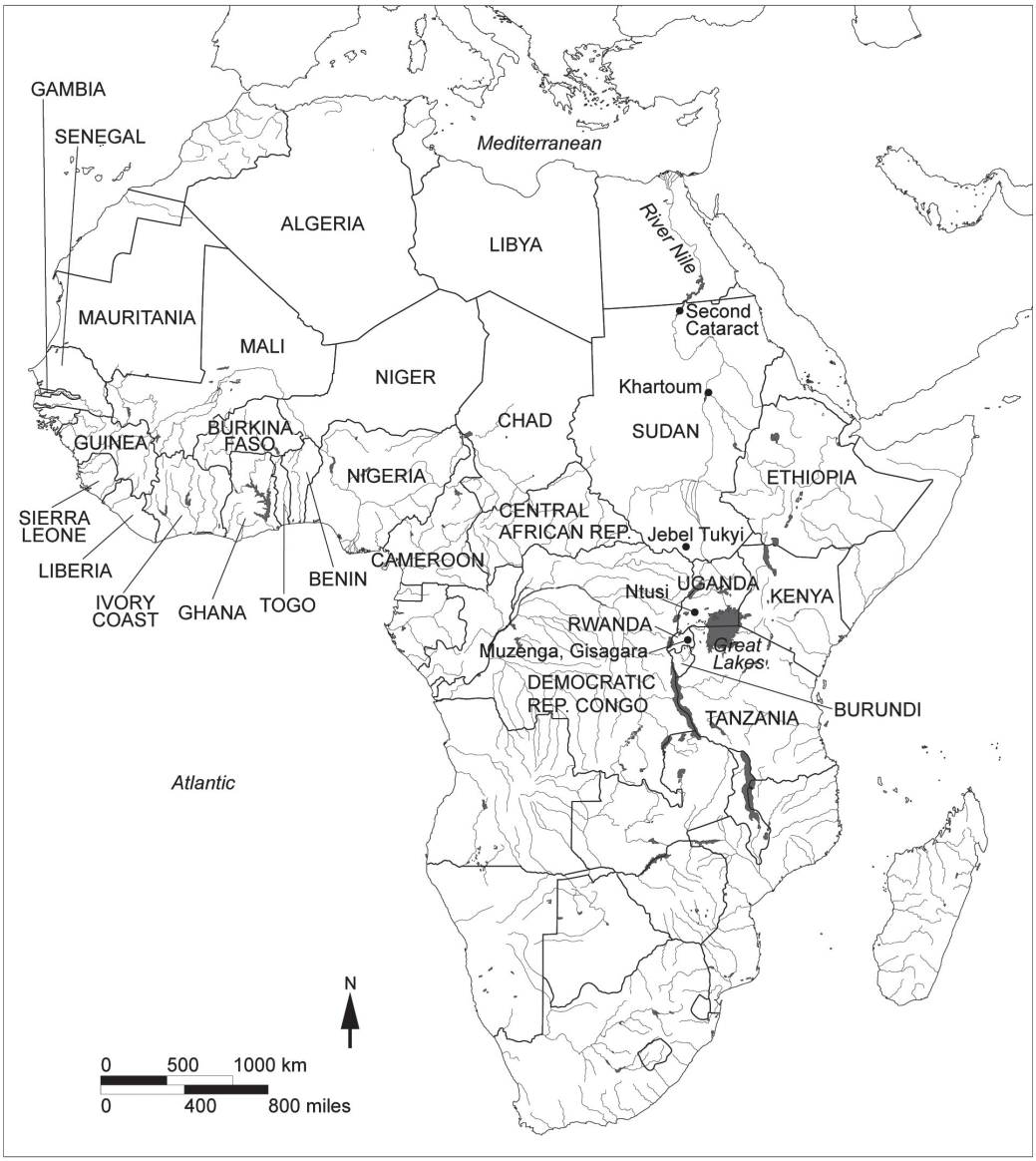
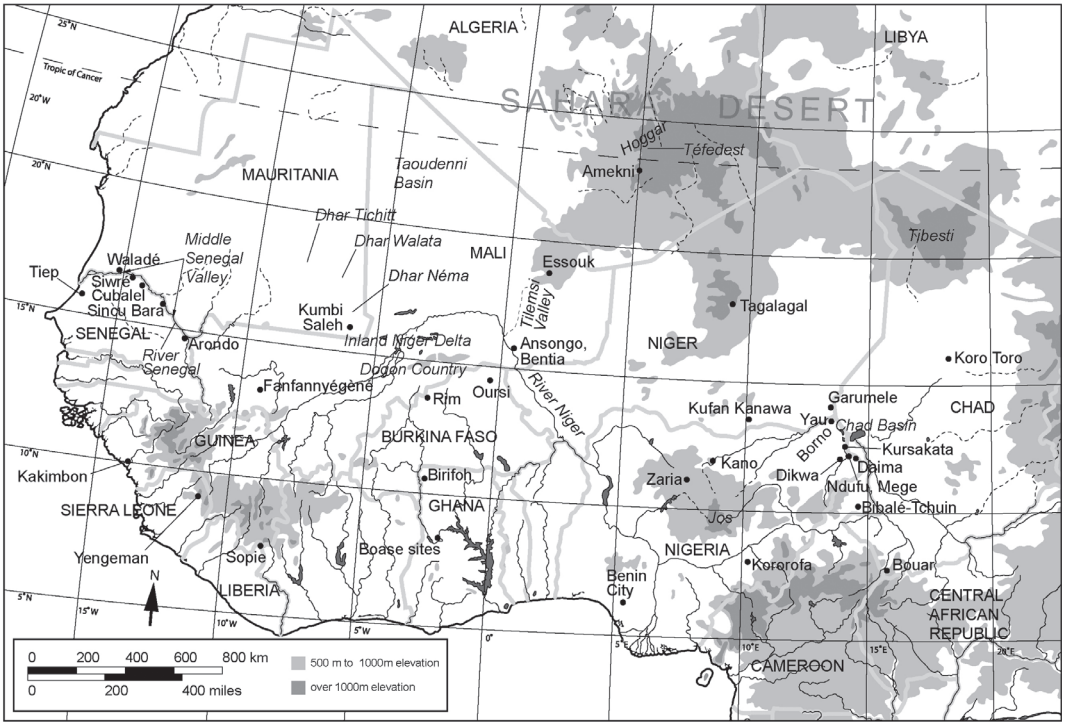
The project has benefited from being based within the convivial intellectual ferment of the School of World Art Studies and Museology at the University of East Anglia, and the Sainsbury Research Unit within it; we gained in particular from ongoing discussions on African ceramics with Joanne Clarke and John Mack.

Throughout the volume, we have endeavoured to keep terminology consistent. For the location of the countries, sites and areas discussed, please see Maps 1 to 3.

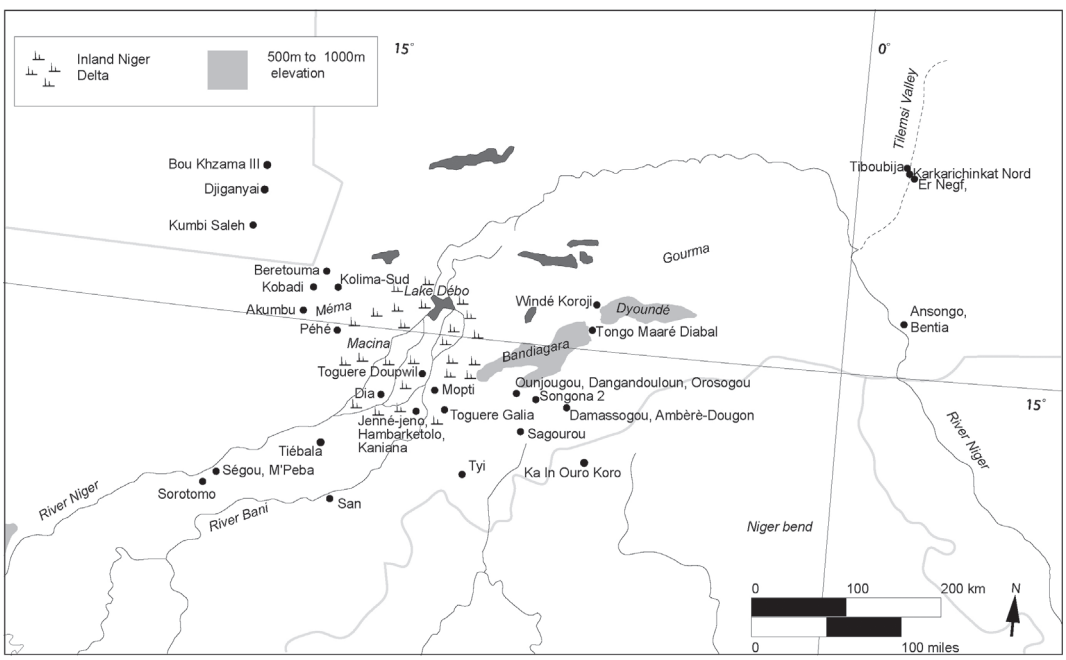
Maps



Map 1. Africa



Map 2. West Africa



Map 3. Central Mali

Introduction

Olivier Gosselain, Anne Haour, Kevin MacDonald and Katie Manning

Aims and Content

This volume is concerned with the decoration of African pottery via the impression of objects, known as roulettes, onto the surface of pots before firing. The sheer number of objects that can serve as roulettes, and the various manners in which they can be impressed (rolled, rocked, impressed singly or pivoted), belie the apparent simplicity of the technique. Indeed, because of variation in type and mode of use for roulettes, these tools can justifiably be considered the epitome of technical diversity. Roulettes have been associated with pottery assemblages of the continent for millennia, and today comprise a range of objects, from twisted pieces of cord to carved wooden cylinders; from fish bones to hair curlers; from folded sections of palm fibre to bicycle springs. At the onset of the twentieth century, and for much of the following decades, rouletting tools were used within the African continent across an area about the size of the United States. This was a peak in what could stand as the biggest 'success story' in the history of pottery decoration in Africa (Gosselain 2000; Livingstone Smith 2007). Nowadays, rouletting tools continue be used in most of this area, but we are also witnessing their progressive decline, not simply because pottery vessels are increasingly replaced by metal and plastic containers, but because of a loss of popularity against new decorative fashions, such as painted motifs. Yet, if what we are concerned about within this book is an historical technical tradition in pottery decoration, it is above all an ongoing tradition. This point is crucial, since it confers upon the African continent a unique role for the study of roulettes. In most other areas of the world where rouletting was practised in the past, there exist no contemporary parallels. African examples therefore provide a link between past and present. They also allow us to explore questions relating to the social context of the making and use of rouletting tools, and help us test new hypotheses about material culture, whilst at the same time covering a huge part of Africa's past.

This volume, which aims to improve the recognition and identification of impressed pottery, with a particular focus on West Africa, comes at a key point in African ceramic studies. This field of research has a long and distinguished scholarly history, which has drawn in anthropologists, ethnographers, art historians, museum curators and archaeologists. It has been marked both by painstaking description and by broad-ranging theoretical debates. Among the debates, perhaps none have been livelier than

those surrounding issues of material style, of which we provide a short synthesis below. The time is now ripe to bring together different approaches to stylistic behaviour. In recent decades, attributes of technical style rather than decorative style have formed a focus of anthropological and ethnoarchaeological enquiry in Africa: for instance, the question of shaping techniques. The incomplete nature of archaeological datasets often means, however, that such technical attributes may be lost, leaving decoration as one of the only representations of stylistic information. The recognition that decoration is also a 'technical behaviour' amongst others, and the appreciation that visual aspects of style do not necessarily transmit deliberate information, allow us to return with a fresh perspective to the implications of rolled impressions. Moreover, recent ethnographic and ethnoarchaeological work has made available data on the vast temporal and geographic distributions of pottery attributes, such as forming techniques, substantially improving our knowledge of the evolution of potting traditions in Africa ('Mission Archéologique et Ethnoarchéologique Suisse en Afrique de l'Ouest (MAESAO)' – Gallay and Huysecom 1991; Gallay *et al.* 1996, 1998; Mayor in press; Mayor *et al.* 2005; 'Projet Céramiques et Sociétés' – Gosselain *et al.* 1996; Gosselain 2000, 2001; Livingstone Smith 2007; 'Mandara Archaeological Project' – David and MacEachern 1988; David and Sterner 1989; David 1998). Building on such work, a resurgence of interest in the distribution of decorative techniques is under way. However, such an undertaking demands a detailed understanding of the nature and usage of pottery decoration tools.

In archaeological terms, the construction of ceramic typologies continues to act as a cornerstone for research across Africa. Such fundamental work is, in fact, a crucial priority for this vast area of land, where many regions are still virtual *terra incognita* and where archaeological sites are most visible through the myriad potsherds scattered over their surface. Indeed, people in the Sahara were among the earliest potters in the world, around 10 000 to 8 000 years ago, but strangely, even in the case of these earliest African ceramics, the identification of the actual implements used for decoration has only rarely been a priority of ceramics research. This is particularly problematic for cord-wrapped roulette impressions, and two very divergent models exist for their first appearance: such roulettes may either

> be amongst the first cord-based decorative techniques used on the continent, or merely part of a flowering of cord-based roulettes centred on the Middle Niger Basin from the third millennium BC onwards (Livingstone Smith 2007).

The reason for this impasse may be found in differences of analytical practice among researchers. We cannot share the opinion of Isabelle Caneva, who writes:

> "…we do not think it is a good strategy to describe decorations through the examination of the instruments used to make them… we think that it is hardly possible to reconstruct (or even to imagine) the entire range of tools which might have been used" (Caneva 1983, 166).

While there are strong exceptions to this trend (see, for example, Keding 1997), many publications from the Nile Valley have tended to scrutinise decorative 'patterns' rather than to reconstruct the tools which created them. We are still left with the indiscriminate usage of awkward terms such as 'wavy-line' and 'dotted-wavy line', motifs which

could be made using a type of roulette just as well as a stylus or comb; in other words, these terms remain *fossiles directeurs* of ambiguous definition (Mohammed Ali and Khabir 2003; Manning 2009). Crucially, a reliance on such *fossiles directeurs* is no longer appropriate, for in some regions at least, ratios of different pottery decoration types seem to constitute a more important chronological indicator than does their presence or absence. Plainly, in these conditions, it is necessary not just to analyse as large an assemblage as possible, but also to use classificatory schemes which are adequately descriptive, systematic, and clear to other researchers. In such schemes, a reliance on decorative 'patterns' is not viable: only a reconstruction of the tool that was used to produce those patterns can provide a clear picture of the characteristics of, and variability within, particular decorative types.

But for any coherent picture of the past to be apprehended, it is necessary not just for new regional pottery sequences to be developed, but also for these schemes to employ a common, readily transferable terminology and classificatory framework. Such standardisation is a *sine qua non* for any meaningful inter-regional comparisons between ceramic assemblages. At present, the archaeological coverage of Africa, patchy at its best, has been constructed by a diverse and multinational set of researchers, generating an assortment of methodological approaches and discordant terminologies for characterising regional ceramic assemblages. As the pace of archaeological enquiry into the West African past quickens, it is imperative that firm foundations are set, and that they can be shared across regional, linguistic and scholarly boundaries. Extreme rigour is required, and this volume hopes to provide a widely usable framework for the archaeological description of roulette-impressed pottery.

Crucially, in our view, a consideration of archaeologically-evidenced pottery roulettes does not, and cannot, make sense without a consideration of modern-day practices of roulette -making and -using. In the definition of any subset of rouletted ware, impression, mode of application and decorative tool involved must be clearly identified or, at least, hypothesised. This book thus integrates ethnographic and archaeological datasets to improve the archaeological recognition of roulette-made impressions.

In summary, the present volume distinguishes itself from existing works through at least two key characteristics:

- We focus on the types of roulettes used to decorate pottery, rather than on the appearance of the pottery itself. This focus on the 'cause' rather than the 'effect' has led us to develop a systematic framework for the classification of roulette types, starting from an ordering of known ethnographic data.
- We include a large number of high-quality images of archaeologically-recovered roulette-decorated ceramics. So far, such images were scattered through a multitude of publications, with uneven qualities of graphic representation, which formed a major stumbling block to the development of reliable comparative identifications.

Only by privileging a consideration of the tool, and by including a good database of images, can we hope to discern the defining characteristics of the various types of impressed decoration: and thus identify any ruptures or continuities between types.

Roulettes as markers of individual and social style

Roulettes, as a cultural item *par excellence*, cross-cut crucial issues, perhaps most notably the question of style. Approaches to style in material culture studies, and subsequently in archaeology, have been punctuated by significant theoretical and methodological shifts over the decades. Partly because of its durability and persistence through time, as well as the malleability of clay that makes it so amenable to change, pottery has, and continues to be, at the forefront of changing positions. Whilst it is not our intention to add another voice to the ever-growing debate on style in archaeology (for this see such publications as Carr and Nietzel 1995; David and Kramer 2001, 177–183; Hegmon 1998; Gosselain 2002; Martinelli 2005; Haour and Manning *in prep.*), it is evident that a work advocating an improved scheme of roulette classification must first situate itself within the wider context of theoretical approaches to decorative techniques and stylistic characteristics.

Despite years of interest in material style, it has proved a difficult thing to define, even though "most archaeologists probably think they know what they mean by the term" (Hegmon 1998, 265). Style has often been referred to as elusive or controversial because of its ambiguous meaning, and prior to the 1960s and 1970s was considered primarily as an extant phenomenon of material culture, associated with 'non-functional' aspects, and in particular with decorative attributes. In pursuit of an almost taxonomic approach to material culture, scholars perceived stylistic variability as a means of seemingly self-regulating adaptation to the external environment (see e.g. Clarke 1962, 1967). In this way, ceramic 'styles' constituted passive witnesses of ill-defined cultural norms, and were supposed to allow the mapping of past cultural boundaries.

By the mid-1970s, however, archaeology had entered into a new phase of critical reaction to such culture-historical approaches. Archaeologists began to specifically address the relatively dry and acultural form of positivism advocated by scholars such as Clarke (1962, 1967), and began a more sustained dialogue with anthropology in an attempt to understand what exactly material style was, and what it could tell us about social identity. In the late 1960s and early 1970s, for example, a group of papers published by Deetz (1968), Hill (1970, 1972) and Longacre (1964) advocated a form of 'ceramic sociology' founded on the idea that the matrilineal organisation of potting traditions in historic and contemporary pueblo societies of the American Southwest had prehistoric antecedents. If it were the case that matrilocality existed in the past, these authors suggested that microtraditions of potting styles would be clustered within matrilineal units, as they perceived them (Deetz 1968, 45). However, the Deetz/Hill/Longacre model was perhaps overly systemic, relying on a complex set of assumptions concerning what characterised ceramic style, how potting traditions were passed on from one producer to another, and what social processes underlay ceramic production. Indeed, a key assumption in their work was that ceramic 'styles', which they equated with generalising patterns of descent and the learning process of pottery manufacture, were defined primarily by the decorative stage in manufacture. No critical attempt was made to understand how decorative attributes articulated with ceramic style, or how decorative traits were actually manufactured and perceived within culturally specific contexts.

Thus, whilst ceramic sociology offered a more optimistic view on studies of material culture and social identity, it remained essentially positivist in its outlook. Two influential concepts were, some years later, to radically change archaeological approaches to style. Hegmon (1998, 264) succinctly summarises them as two statements; 'Style has function', and 'Technology has style'.

The first development, emerging out of a growing concern for the human agent in processes of social change (Bourdieu 1977; Giddens 1984; see Dobres 2000 for a detailed discussion), was pioneered by authors such as Wobst (1977), Hodder (1982, 1986) and Sackett (1985). Proposing that 'style has *function*', and more specifically that style is actively manipulated in the transmission of cultural information between non-related social groups, Wobst (1977) broke from earlier traditions which had failed to actively engage style with social systems. His theory of information exchange, portraying style as active in the constitution of social identity, triggered a wave of critical approaches to stylistic behaviour. These emphasised the idea of style as an active choice in the making of material culture, highlighting the human agent as the driving force behind issues of identity and its material manifestation (Wobst 1977; Hodder 1982, 1986; Miller 1985; Sackett 1985). Studies of agency and material culture therefore challenged the notion that stylistic behaviour passively represented delimited cultural blocks, and instead proposed that actions, including material production, are dependent upon the contingent relations of 'knowledgeability', 'rules' and 'resources' (Bourdieu 1977). Thus, style allows us to ask *what* cultural diversity actually is, and *how* it is socially constituted and maintained. However, under the theoretical umbrella of 'New' or 'Processual' Archaeology, the notion of style as serving a strategic function in communication meant that undue emphasis was placed on the finished artefact, consequently (and ironically) separating the object from its fabrication process, or the pot from its potter.

In the same year as Wobst published his seminal paper, Lechtman and Merrill's (1977) edited volume presented an alternative view of style and of its relationship to social identity in archaeology. Whilst the second group of papers in that volume deal with alternative anthropological approaches to technology, Part 1 of the book focuses explicitly on 'technological style'. In the preface, referring to this Part 1, Merrill (1977, vi) outlines the approach to technology as the "culture surrounding the actions or activities involved in making or doing things". This sort of holistic approach to technology echoes strongly the French school of the 'anthropologie des techniques', which asserted that techniques reflect socialised actions inscribed on matter (Leroi-Gourhan 1943). As such, technological approaches to style in archaeology have developed partly in critique of Wobst's theory of information exchange (e.g. Lemonnier 1986, 1992; Pfaffenberger 1992; Dietler and Herbich 1998; Hegmon 1998; Dobres 2000). As well as tending to ahistoricity, models which equate style with the conveying of information, can, noted Hegmon (1998, 265),

> "be criticized for their extreme functionalism and for assuming that people passively played out their roles in their cultural systems".

In the case of scholars working on ceramic style, the technological emphasis shifted attention away from finished products to a more holistic investigation of the manufacturing process (the *chaîne opératoire*). In this way, style emerged as a polythetic phenomenon, conceived and created throughout the manufacturing process. Not

only is a vessel's eventual 'style' composed of multiple layers, each representing a different stage in the manufacturing process, but these layers also provide insight to different aspects of the social context. By means of this convention, technical attributes, each invested with their own stylistic information, can be distinguished, so that the various relationships between materials, tools and techniques are analysed and related empirically to questions about knowledge and social identity. Some aspects of style, for example, can play a role in defining group identity (Wiessner [1983, 1984] describes this as 'emblemic style'), whilst others may reflect a greater degree of individual expression.

In recent years, such issues have been rigorously pursued by researchers working on pottery traditions in sub-Saharan West and Central Africa (in particular the 'Mission Archéologique et Ethnoarchéologique Suisse en Afrique de l'Ouest (MAESAO)', the 'Projet Céramiques et Sociétés', and the 'Mandara Archaeological Project' cited above). Contributors to these research initiatives have mapped different stages in the sequence of pottery production across vast areas, demonstrating that not every stage of the manufacturing process is susceptible to change at the same rate and for the same reasons. Vessel-forming techniques, in particular, appear to correspond more meaningfully with enduring, deep-rooted facets of social identity (kinship, language, gender, class), while other stylistic attributes, more visible on the finished product (for example, decoration), are more frequently associated with situational aspects of identity (Gallay *et al.* 1998; Gosselain 2000, 2001 and references therein). These more salient attributes are considered to be technically malleable, reflecting more fluid notions of identity, as opposed to fundamental social alignments. Decorative styles or slipping techniques, for example, can easily be exchanged, borrowed or copied across social boundaries, whilst the forming process is

> "likely to remain stable throughout a potter's lifetime, and it should reflect those most rooted and enduring aspects of social identity, such as kinship, language, gender and class subdivisions" (Gosselain 2000, 193).

Interestingly, such a situation is due less to the fact that the forming process relies on basic motor habits learnt at an early stage, as previously thought (Arnold 1981; Gosselain 2000), than to the situated and socially constituted relations that develop through learning and practice (following Lave 1996; Lave and Wenger 1991). Thus, the way in which potters are socialised into the craft leads them to view shaping technique as both an "inheritance" and a materialisation of their social affiliation, which generally translates into conservative behaviour, though it may also open the way to technical manipulations (Gosselain 2008ab). Other parts of the technical repertoire may conversely be perceived as vehicles for ascertaining social ties and negotiating one's position into a community of practitioners (Gosselain 2008ab).

The idea that objects have a life history, tangled with that of the people who make and use them and reflecting a layering of cultural information, echoes of other post-processual lines of thought in archaeology. Current nuanced understandings of ethnicity, for example, hold that group identity is not a passive and straightforward reflection of a distinct culture and language (Jones 1999, 224). Rather, ethnicity is employed by individuals to make sense of themselves and of the society in which they live; as

evidenced by anthropological studies, it is a dynamic, contested and multi-layered process, a 'category of practice' (following Cooper and Brubaker 2000; Chrétien and Prunier 1989; see also Amselle 1990; Shennan 1994; Jones 1997; contributions in Stark 1998; Pauketat 2001). As social identity is continually negotiated, archaeology must necessarily contextualise socialised action in relation to social, political, economic and symbolic concerns. Yet despite the underlying fluidity of social identity, ethnoarchaeology continues to document people's insistence on ethnic self-identification, demonstrating that notions of social identity *are* reflected through material culture (Gallay 1991–92; Gallay *et al.* 1996; Gosselain 2001, 2008ab). In brief, as social theorists explore how materialisation aids the constitution and maintenance of social institutions and identities across time and space, archaeologists have much to learn, and much to contribute. Perhaps the most important lesson, and one that underpins the objectives of the present book, is that technical style clearly has significance for modern-day craftspeople. The production of particular pot forms, use of certain techniques, and application of certain decorative motifs fulfils not only the demands and expectations of a specific consumer market, but also those of communities of practitioners. Changes to that production process are likely to have social, political and economic implications. All in all, ethnographic and historical enquiries demonstrate that 'pottery cultures' are not constructed chaotically, according to the whim of people's interactions or the mechanical diffusion of components, but are always strongly channelled at both the collective and individual levels. Potters endlessly classify the techniques, tools, and materials available to them. They give meaning to them and adjust them to changing circumstances, not only with a view to maximising profits or reproducing some tacitly shared norms, but also in order to act upon their life and the surrounding world. And clearly, if technical manufacture is socially meaningful to potters and their consumer market, then so should it be to archaeologists!

Regarding the 'channelling of elements' in the realm of decorating practices, a crucial distinction must be made between visual perception – a salient attribute, readily borrowed or exchanged across social boundaries – and actual knowledge of how a decoration was made. Take a motif impressed with a carved roulette, for example. Those acquainted with the tool will readily recognise it; others may interpret the pattern as having been made with a stick or a comb. This was the case in northern Cameroon, where a Dowayo potter was seen to copy roulette motifs using the straw she employed to make other decorations, claiming that it was impossible to do otherwise (Gosselain, personal observation). Also, in southern Niger, a Hausa potter maintained that an impressed pattern, obviously made with a husk of *Blepharis ciliaris*, was actually made with a cord, a tool she was familiar with (Gosselain, personal observation). In both cases, 'unaccompanied reifications' (Wenger 1998, 111) – here, pottery decorative types – are thus reinterpreted in the light of what people already know when initially confronted with them. As this book illustrates, there exists enormous variability in roulette types encountered across sub-Saharan Africa, and whilst some roulettes (such as the twisted cord roulette) may be considered relatively easy to make, use, identify on finished products and therefore copy, others (such as braided strip roulettes), represent quite intricate pieces of engineering, not so amenable to replication by the casual observer. Hence, their spatial and temporal propagation throughout the continent may be indicative of stronger ties between communities of potters – i.e., implying actual

interactions and transmissions of knowledge – than that of other decorative categories. Concurrently, the discrete distribution of specific categories of tools or decoration techniques may reflect ruptures in social interactions. In proposing a systematic and detailed documentation of different roulette types, which considers their constituent material, means of fabrication and mode of application, this volume seeks to open new avenues in the analysis of pottery decoration and not 'merely' to devise a new typology of roulette motifs.

It is only once we are armed with a sufficient level of detail on roulette types that we may begin to untangle the complex web of decorative variability in sub-Saharan Africa, and, indeed, its articulation with social identity. Stewart (1993) once urged archaeologists to seek to understand how and why traits move between groups, rather than to use them as the very definition of these groups. It is hoped that this volume will act as a further catalyst for discussions of the association between roulettes and people, which is obviously anything but simple or univocal (compare, for example, Herbich [1987] with Siiriaïnen [1984]). Here we cannot aim to deliver a final verdict on the interpretative utility of African pottery roulettes – but rather, we can explore the potential and limitations of these tools, which comprise some of the most visible decorative techniques of the sub-Saharan past.

Identifying and classifying African roulettes: previous studies

Thanks to long-term scholarly interest in them, roulettes offer an historical perspective on a recurrent archaeological problem: the building and use of typologies. Africanist archaeologists have long recognised the existence of the roulette as a means of decorating pottery. For example, as early as 1901, Hamy (1901, 392) wrote of the incised pottery of Kakimbon rockshelter (Guinea): "*Toute cette ornamentation est…executée à la main, sans aucun peigne et sans roulette*". Early prehistorians, such as de Zeltner (1915) and Hubert (*et al*. 1921), used their first-hand knowledge of Africa's living pottery traditions as an adjunct to their understanding of 'prehistoric' industries. In particular, Hubert (*et al.* 1921) carried out purposeful 'palaeo-ethnographic' enquiries to aid in the construction of a decorative typology for the ancient pottery of Mauritania – although roulettes ultimately formed only a single undifferentiated category in their scheme. Griaule and Lebeuf (1948, 22), in their well-known study of sites of the Chad Basin, pushed the analysis further, recognising that the impressions obtained depended "*de l'outil lui-même et de la manière dont il a été employé*", and made parallels with various roulettes in use in the region at the time. Meanwhile, in eastern and central Africa, early classifications also took roulettes into account, but again, did not subdivide this category.[1]

Not all early archaeologists in West Africa chose to reconstruct roulettes, often citing as an obstacle lacunae in ethnographic observations. Instead they described their motifs in terms of mere patternings, with little reference to the process which created them. In his analysis of material from the Zaria region (Nigeria), Effah-Gyamfi (1981, 51, n.4) noted that the terms he used to describe particular types of roulette, although relating to types that were 'clear and easy to identify', might not necessarily relate to the tools used 'in the olden days' and that more precise descriptions would have to

await experiments with, and observations of, modern communities in the area. In a more recent publication, Connah and Daniels (2003) present a re-analysis of pottery collected in the 1960s and 1970s from Borno, in the Nigerian part of the Chad Basin. Here they highlight the observational approach to pottery analysis which was prevalent at the time of the excavation. They write

> "It should be stressed that these groupings are, again, essentially observational. These attributes are grouped together because of their appearance and the comparative difficulty of separating them. The names are subsequent and represent either guesses at the way in which the decoration was made, or neutral descriptive umbrella terms" (Connah and Daniels 2003, 41).[2]

However, by 1966, the first intensive classificatory work on North African and Saharan pottery had appeared. This was an almost exclusively archaeologically-derived or experimentally-based work by Henriette Camps-Fabrer. In it, she recognised three types of roulette: a braided cord roulette (*roulette tressée*), a cord-wrapped stick roulette (*peigne fileté*), and a natural plant stem roulette (*épi végétal*). Combs, stylii and natural decorative tools such as shells were, however, much more extensively sub-divided.

In 1970, an explicitly ethnoarchaeological project by Alain Gallay in Mali documented several new classes of roulettes, particularly carved cylinder or toothed roulettes of which two types were presented. Additionally, vegetal roulettes (*épis végétaux*) were included, although only one variety of cord roulette was cited (Gallay 1970). This ethnoarchaeologically-derived typology was later applied by Gallay (1981) to archaeological materials from the eastern edge of the Bandiagara-Dyoundé escarpment range in Mali.

From the late 1970s onwards, rapid developments in the classification and interpretation of pottery roulette were to take place. This was due primarily to two factors: (1) a vogue, provoked in part by the New Archaeology, to classify and quantify in more statistically relevant detail the 'stylistic' elements of archaeological objects, and (2) a proliferation of ethnoarchaeological studies, sometimes by the same archaeologists performing analyses of ancient ceramic assemblages.

Initially, advances related to central Mali, the most important studies including those of Bedaux (*et al*. 1978) and S. and R. McIntosh (1980). Bedaux *et al*. (1978, 136–137) drew on the earlier work of de Meulemeester (1975), who had constructed experimental roulettes to help explain the archaeological material encountered in excavations at Kororofa, Nigeria[3]. Bedaux *et al*. (1978) devised a cord roulette typology of nine types, which included perhaps the first technically correct archaeological description of a strip roulette (*cordon*), a cord-wrapped roulette (*brins tressés*), and four types of braided cord roulettes. Although this list was incomplete, and its terminology rather inadequate, it was the first detailed description of cord roulettes to be used in the analysis of an African assemblage, in this case that of two tell sites in the Inland Niger Delta. Later, this same typology was to prove its transferable utility in an analysis of eleventh- to thirteenth- century Tellem pottery of Mali, by Bedaux and Lange (1983). In this latter publication, Bedaux and Lange (1983, 7), noting that "*il existe beaucoup de confusion quant aux impressions de roulettes de cordelette*", took the precaution of including suggested ethnographic examples of the archaeologically-encountered roulettes.

At about the same time, Susan McIntosh was confronting the dazzling array of manipulations of flat fibres and cords (both referred to by her as 'Twines') which had been practised in the ancient Inland Niger Delta, at the early urban site of Jenné-jeno. In her first classification of this pottery, she distinguished six types of roulette including what are now termed twisted cord, braided cord, and strip roulettes. In this initial work, no technical explanations for these roulettes were provided (S. McIntosh and R. McIntosh 1980, 112–157). But, by the publication of the second Jenné-jeno monograph, more explicit nomenclature was utilised and an additional eight types defined, including cord-wrapped roulettes (see comparative table in S. McIntosh 1995, 137). The outstanding value of S. McIntosh's work has been its provision of good sample size and time depth, showing elements of both stability and change in pottery decoration at one site over 1500 years. S. McIntosh's classificatory scheme has also been successfully employed in other survey and excavation programmes, including the Middle Senegal Valley Project (S. McIntosh *et al*. 1992).

In addition to Camps-Fabrer's (1966) synthesis mentioned above, Africanists began to draw on further bodies of data on rouletting. Most important perhaps was Hurley (1979), who assembled an encyclopedic database of over 270 types of cord manipulation. This is more a catalogue of what is theoretically possible than a record of what has actually been documented, with some variations on a theme almost indistinguishable from each other. Most problematically, Hurley's work concerns only variations on two categories of roulette, namely twisted cord and cord-wrapped roulettes, plus a few braided cord roulettes. Entire categories of roulettes, the importance of which is left in no doubt by ethnographic work, are omitted. Such is the case, for instance, of roulettes involving the knotting, braiding or folding of flat sectioned fibres (strips). Another source of data, and one on which Hurley himself drew, was the work of Japanese archaeologists, who had a long history in the study of cord-impressions given this decorative motif is prevalent on the famed Jomon pottery (see below, page 13). The classification of cord roulettes and their experimental recreation were especially precocious there: detailed typologies existed from the 1930s with the work of Sugao Yamanouchi (see Kidder 1957[4]; Yamanouchi 1964; Esaka 1968; Sahara 1981). However, neither those, or Hurley's, studies were designed for the African data, and they were derived from experimental work, that is to say they recreated modern roulettes in an attempt to replicate patterns found on archaeological samples, or simply to make an exhaustive catalogue of all possible manipulations. This experimental angle was due to the fact that these databases issued from areas of the world – North America and Japan – where there existed no living tradition from which to acquire first-hand knowledge of roulettes.

A rather different approach to a pan-African cord roulette classification was foreshadowed when Soper (1979) presented a brief note in *Nyame Akuma*, entitled simply 'Cord Rouletted Pottery'[5]. This piece was essentially a critique of the *status quo* in East African pottery studies at that time (Soper 1979, 12), pleading that "the validity of a finer subdivision of roulettes can hardly be denied" and noting that treating rouletting as a single phenomenon obscured probably culturally-significant differences, leading to false or oversimplified conclusions. This concern culminated in Soper's 1985 article in *African Archaeological Review*, offering a straightforward and logical typology which soon became a standard, basic language of roulette comparison amongst African pottery specialists.

Soper (1985, 31–41) proposed the following categorisation of roulettes:

1. Unmodified objects (such as maize cobs)
2. Rigid roulettes
    a) Carved wooden
    b) Clay or carved stone
3. Flexible roulettes, which Soper (1985, 33) noted "present the greatest complexity of effect and hence should have the greatest potential for the identification of prehistoric cultural entities", going on to remark that this complexity seems to have "baffled or discouraged the few archaeologists who have dealt with such material".
    a) String (including twisted and knotted varieties)
    b) Strip (including knotted and 'accordion pleat' varieties)
4. Composite roulettes (i.e. cord-wrapped roulettes)

This well-illustrated typology was readily engaged with by other researchers. Upon closer scrutiny, however, it is rather too compact, and lacks several important ethnographically – and archaeologically – documented roulette types. Indeed Soper himself was well aware of these issues, noting for instance of roulettes made of flat-sectioned strips that a great variety of such tools exists in the archaeological material in West Africa, "most of which remain to be identified and analysed in detail" (1985, 39)[6]. Nevertheless, Soper's classification remains a great benchmark in African pottery studies; his article was also perhaps the first to ask specifically what the study of roulettes might ultimately tell us about the African past.

In East Africa, where archaeologists and linguists have worked closely together in the field of Bantu studies, the use of roulettes as markers of ethno-linguistic groups has (perhaps unadvisedly) been commonplace. Desmedt (1991), for example, established a relationship between different categories of roulette and different cultural groups. She wrote for instance that "*le groupe X (roulette nouée) apparaît en Ouganda dans les premiers siècles du second millénaire, suivi du groupe Y (roulette torsadée fine); à partir de 1500 AD, ils remplacent le groupe W dans la région interlacustre*"(1991, 161). The types of roulette envisaged, and their relationship to Soper's terminology, are clearly articulated and illustrated (Desmedt 1991, 163–164). Stewart (1993, 32) has, however, criticised this approach – demonstrating that "pottery styles can and do cross linguistic boundaries". To this, Robertshaw (1994) added that Desmedt's correlation of decorative techniques and language groups could be queried not just on theoretical grounds but also on the basis of historical and linguistic evidence.

At the margins of the Bantu world, in West-Central Africa, David and Vidal (1977) carried out a rare 'non-Bantuist' study linking 'prehistoric' material culture, comparative ethnography, and linguistics on a broad scale. Interested in the population and language history of the Bouar region of the Central African Republic, David and Vidal undertook excavations at the first-millennium AD village site of Nana-Modé. The predominantly carved roulette-decorated pottery tradition which they found there caused them to scrutinise the archaeological and ethnographically-documented pottery assemblages of the Central African savanna. Their research indicated an unexpectedly long period of local technological continuity (from *ca.* AD 700 to the present). Additionally, they suggested that the gradual eastward movement in the use of wooden roulettes, from

the Jos plateau (Nigeria) to the Bouar region between *ca.* 500 BC–AD 700 and then into Uganda by *ca.* AD 1500, might be linked with the expansion of Adamawa-Ubangian language speakers.

The last fifteen years have seen an explosion of interest in pottery roulettes: both in terms of definitional frameworks and in the wider questions relating to roulette usage and distribution. In 1996, a session devoted to roulettes was organised at the Society of Africanist Archaeologists (SAfA) meeting in Poznan (Poland) by Olivier Gosselain and Kevin MacDonald. In 2000, the workgroup CERAFIM ('Céramique Africaine Imprimée'), comprising Africanist archaeologists studying prehistoric and protohistoric ceramics, was set up and held two meetings. It has put on-line an important catalogue of illustrations (http://cerafim.free.fr) which follows Caneva's 'arborescence' classification system (Caneva and Marks 1990) to achieve an index of motifs (see also Langlois 2004; Gallin 2008; special issue # 13 of *Préhistoire Anthropologie Méditerranéennes* 2004). Its particular strength lies in its consideration of 'ornamental grammars', that is to say the constitution of motifs by combination of impressions, engaging explicitly with issues of style, and with its vast remit which embraces the use of combs as well as of roulettes, and areas ranging from Mauritania to the Nile Valley and Djibouti, via the Maghreb and parts of the Sahel. In the Niger Bend, Mayor (Mayor 2005, in press; Mayor *et al.* 2005), using an actualistic approach, has linked ethnographic and archaeological datasets to retrace the culture history of various rolled decoration types and of shaping techniques, in connection with regional ethnolinguistic groups; this with a view to reinterpreting and refining archaeological assemblages. In terms of the wider picture, at the continental or regional level, syntheses of specific classes of roulettes have been offered by Gosselain (2000) and Livingstone Smith (2007), both of whom contrast fibre and carved wooden roulettes; and Langlois (2004), who considers the classification and distribution of roulettes in the greater Chad Basin. Finally, as regards typological definitions in archaeological monographs, matters have been greatly improved by some archaeologists' increased care in description and concern for cross-referencing of colleagues' work. Most welcome here is the inclusion of tables of equivalence by, for instance, Wiesmüller (2001) or Schmidt *et al*. (2005, 226–227). Such tables relate the terms used by these authors to the terminology of predecessors, rather than unnecessarily re-inventing the wheel.

In summary, research into African rouletting techniques has a long history, its development paralleling in many ways that of archaeology and anthropology as disciplines. The earliest phase proceeded in a relatively piecemeal fashion: studies related to isolated cases, depending on scholars' interests or skills. A second period saw a gradual recognition of the complexity of existing roulette types, and the elaboration of progressively more developed typologies – an evolution often visible in the successive publications of particular authors. Finally, the past ten or fifteen years have seen the first truly synthetic overviews, made possible by the combination of increasing data points and a growing theoretical sophistication. The present book can be seen as a further step along this path, and one which will, it is hoped, inspire debate and lead to further field studies of rouletting in Africa and beyond.

Fibre roulettes beyond Africa

It is useful at this juncture to remind ourselves that the use of roulettes as pottery-decorating tools has been a global practice. This can be illustrated by looking at the example of fibre roulettes, which are best documented in the literature.

The earliest known ceramics featuring rolled fibre roulettes come from the transition of the Incipient and Initial phases (9500 bp [before present]) of the Jomon tradition in Japan (Kenrick 1995, 47). Indeed, the very word 'Jomon' means 'cord-marked' in Japanese. It is apparent that from the Initial Phase onwards there already existed an incredible diversity of cord roulette types, including a variety of cord-wrapped and twisted forms, particularly from eastern Japan (Aikens 1995, 12–14; Kenrick 1995, 48, 135–140). Since the pioneering work of Yamanouchi (1964), the typology of these various roulettes has been developed in some detail by Hurley (1979) and Sahara (1981). Yet, it may be fairly asserted that only in Japan, North America and Africa have such typologies of fibre roulettes been widely applied to differentiate the decoration of 'cord-marked' assemblages.

A review of the prehistoric pottery of southern China reveals that 'corded' pottery appears there – particularly at the site of Zeng-pi-yan – around 8000 bp (Chui-Mei 1984). However, the type or technique of 'cord marking' is not discussed. A review of accompanying illustrations (Chui-Mei 1984, Fig. 3a) would suggest that these are mostly basketry or textile impressions (from forming on a mat or with cord-wrapped paddles), with only a few sherds showing possible marks by cord-wrapped roulettes with loose fibres. Tantalisingly, Chui-Mei (1984, 299) notes that "certain ethnic groups in Yunnan today are still making corded pottery".

To the north, new pottery evidence from Siberia attests to surprisingly early dates, with 'cord-marked' wares claimed for the site of Goncharka between 10 600 – 9900 bp (Kuzmin and Orlova 2000). While no further precisions are presented as to the nature of this 'cord-marking,' it is interesting to note that the earliest dates for corded pottery elsewhere in the region postdate 8000 bp; these later occurrences include 'cord impressed' and 'net and string impressed ceramics' (Kuzmin and Orlova 2000, 361).

Kharakwala *et al.* (2004) have supplied a wide-ranging speculative synthesis on the possible association of 'cord impressed ware' and rice agriculture in Japan, China, Siberia and India. Unfortunately, when cross-comparing with other sources, it seems that there is sometimes confusion between dates for the first appearance of pottery and the actual appearance of 'cord impressions' and rice agriculture. Despite this lack of clarity, the article provides an appreciation of exactly how widespread fibre-decorated pottery had become across eastern Asia by the third millennium BC.

It is important to stress that most of the Eastern Asiatic pottery studies outside of Japan lack precise technical descriptions of the so-called 'cord marked' pottery: are these textile-impressed, impressed with cord-wrapped paddles, single-impressed with individual cords, or decorated with rolled impressions and, if so, of what weave are the fibres? A rare exception to this tendency to lump fibre impressions by their generalised pattern rather than by their technical execution is represented by the work of O. K. Singh (1998–1999) on the 'cord marked' pottery of Manipur. Here, an ethnoarchaeological study of the pottery tradition of the Oinmanmao Naga people is used to aid the interpretation of 'linear and criss-cross' motifs on mid-second millennium BC ceramics

from the same region. The analytical conclusion is that these ceramics were decorated with cord-wrapped paddles – a technique which appears to have been relatively common on 'corded' pottery outside of Japan and Africa.

Within Europe, the wider Mediterranean world, and even India, the term 'roulette' often refers not to fibre roulettes but instead to rolled cylinders or spoked wheels, often seen as an attribute of Greco-Roman trade pottery (*ca.* first millennium BC/AD; Begley 1988; Khairy 1983). 'True' roulettes, in the form of cord impressions, are however associated with Neolithic and Bronze Age pottery types in central and northern Europe and Britain. For instance, the third-millennium BC prototypal Corded Ware culture (*Schnurkeramikkultur*) of Central Europe (mainly Germany and Poland) takes its name from the characteristic pottery of the era, described as being decoratively incised by wrapping cordage around the pot (Mallory 1997). Similarly, a characteristic of the Early Neolithic 'Funnel Beaker' (TRB) tradition of northern Europe (*ca.* 4000–3500 BC) are ceramic vessels with impressions of twisted cord (e.g. the Funnel Beakers of the Volling type at Norsminde, Denmark [Andersen 1989]). In Britain, impressions of twisted cord are also found on certain types of 'Grooved Ware'. In particular, one of the defining characteristics of the Durrington Walls sub-style, dated to the mid-third millennium BC, is the application of 'twisted cord' or 'whipped cord' (Hamilton and Whittle 1999). Whilst twisted cord impressions (Hamilton and Whittle 1999, Fig. 4.2) appear to correspond with the Corded Ware description of a twisted cord that is simply pushed into the wet clay (that is to say, single-impressed), so-called 'whipped cord impressions' are more ambiguous. A schematic representation of this decoration by Manby (1999, 61) from mid-third-millennium BC sites in Yorkshire and northern England depicts parallel diagonal rows of cord impressions, closely resembling rolled twisted cord roulette impressions (see Arazi and Manning, Section 3, this volume). In northwestern Russia, Patrushev (1992) also illustrates a type of cord or 'textile' impressed pottery, dating from the end of the second millennium BC, which she refers to as 'spun-speckled impressed pottery'. Otherwise known as 'textile', 'net' or 'pseudo-net' pottery, the photographs presented by Patrushev present an intriguing case for mis-identified roulette impressions (especially Fig. 4, no. 1, 2 and 6). No technical description of these decorations is offered, and the terminology used (e.g. 'spun parallel' or 'imitated cord impressions') gives no insight into the actual tools used. In fact, Patrushev's characterisation provides an example of a typological description based on highly subjective and somewhat arbitrary aspects, as opposed to specific technical characteristics of comparative value.

Despite the relatively recent date of its fibre-impressed pottery, the New World has the distinction of being the first region to recognise the existence of such techniques, with W. H. Holmes describing rolled fibre roulettes and textile impressions as early as 1884. Unfortunately, after this precocious beginning, the detailed study of fibre-decorated pottery in North America slowed considerably. To give some index of this, in their comprehensive typology of the prehistoric pottery of New York State, Ritchie and MacNeish (1949) only differentiated very broad decorative types: cord-wrapped stick, cord-impressed and cord-wrapped paddle motifs, with further divisions based on the location or directionality of application. Subsequently, experimental work re-commenced to differentiate textile-impressed from cord-wrapped paddled North

American ceramics, and to document the fabric types used (Rachlin 1955; Quimby 1961). Yet it was not until Hurley's (1979) landmark volume, alluded to above, that a comprehensive recording system was put in place.

Outline of the book

This volume is divided into three complementary parts.

As stated earlier, a focus on the tools used to decorate pottery, rather than on the pottery itself, is a central principle of our approach. **Section 1** draws primarily upon information from ethnographic examples of roulette fabrication and usage, in order to provide a systematic classificatory framework for roulettes. This simple and elegant framework offers a readily transferable tool for the categorisation of roulettes, and will be used throughout this volume. It is articulated around three key characteristics: the material of which the roulette is made (wood, strip, cord, etc.), the manipulation operated on this material (twisting, knotting, wrapping, etc.), and finally the manner in which the roulette is applied to the body of the vessel (rolled, single-impressed, rocked, etc.). Examples of roulettes drawn from recent fieldwork and museum collections are illustrated here with their impressions.

It is, for the most part, only through a consideration of modern-day data that the bewildering array of roulette types becomes obvious. Yet, the identification of such types is crucial to the archaeologist, working with mere impressions. **Section 2** makes the leap between ethnographic and archaeological data by setting out a methodology for the visual analysis of archaeological materials. Geared at identifying the impressions produced by the acting part of roulettes, and any repetitions or irregularities, this method can be applied by archaeologists to their assemblages to reconstruct the nature and mode of application of decorative implements.

Section 3 is devoted to archaeologically-known instances of roulette-decorated material. The aim of this section, which gathers an unprecedented database of images of archaeologically-recovered roulette-decorated ceramics, is to provide a ready field manual for the identification of archaeological materials. Pottery sherds decorated with different classes of roulette are illustrated, representing sub-Saharan African sites of a wide range of periods and areas. Though most of these can be related to ethnographically-known examples, some types of roulette – perhaps most notably the so-called 'composite' tools, involving the wrapping or braiding of cords over a core – appear much more diverse than at present, and clearly point to the fact that potters in the past may have used techniques not documented today. In this case, only experimentation can offer plausible reconstructions.

Directions for the future

In closing, we believe that several promising future avenues of enquiry can be identified, as well as more than a few areas 'in the shadows' necessitating future study if the complexity of roulette distribution and use is to be grasped.

Future field studies need to document the process of roulette-making in more detail, as well as the learning processes involved, before such techniques disappear. Roulette-making seems to have so far attracted little attention and have escaped the thorough *chaîne opératoire*-driven analysis that has been applied to the vessels which they decorate. Because of this, much basic information remains unknown concerning the manufacture and use of roulettes, and their relation to other aspects of material culture. A priority must be to elucidate by whom, and to whom, the skills of roulette manufacturing are transmitted. Indeed, are these skills developed within the practice of other crafts such as rope-making, mat-making, hair styling and weaving? In particular, might they be learnt in childhood? Children's games, and particularly play with fibres, remain a neglected, and potentially fruitful, domain for research. Turning the focus onto the craftsperson will also allow us to better appreciate the causes and significance of variation within specific tool categories. Other questions include possible seasonal aspects in the manufacture and use of roulettes, any known relationship with the harvesting of crops and the use of vegetal materials as temper, and the longevity of roulettes.

Such fine-grained analyses are essential if we are to shed light on the long-debated association of roulettes with ethno-linguistic groups or subgroups. It is clear that to study the distribution of broad categories of tools is no longer good enough: we must acquire data on the distribution of specific tools, from both synchronic and diachronic perspectives. This change of scale should bring us crucial information on the means by which technical styles of roulette manufacture can spread.

The above are all crucial approaches if we are to make roulette impressions a cornerstone of archaeological classifications. But archaeologists also have a great deal of work to accomplish. We must continue to document sequences and distributions of impressed pottery, a process that is slowly accretional but ultimately rewarding. The greater uniformity in roulette classification at which the present book aims will facilitate future syntheses, with major implications both for the identification of local social processes and for the reconstruction of broader zones and sequences of interaction.

Notes

1 For a good review of the origins and development of East African pottery studies see Stewart (1993). Important initial East African pottery classifications which recognise roulettes without further subdivision include Hiernaux and Maquet (1956, 1960), Posnansky (1961), and Sutton (1964).

2 Though, for a relatively early example (research carried out in 1957 and 1962) of the use of ethnographic observation as an aid to archaeological analysis of roulette types, see Willett and Connah (1969).

3 Although de Meulemeester (1975, 211) had rightly cautioned that his experimental roulettes, being reconstructed from string, may not provide good analogues for the 'vegetable fibres' which would have been used in the past (see also Mayor, Section 3, this volume).

4 Although this author reserves the term rouletting (*oshigatomon*) for the use of carved wooden roulettes, a narrowness of definition most Africanists would be unhappy with.

5 This built on his earlier contributions which had begun to differentiate, for instance, twisted cord and knotted strip roulettes in East African archaeological assemblages (Soper and Golden 1969; Soper 1971).

6 See, in Section 3, this volume: Haour and Keita; Haour; Mayor.

Introduction

Olivier Gosselain, Anne Haour, Kevin MacDonald et Katie Manning

Résumé en français par Anne Haour

Objectifs

Notre ouvrage est consacré à une technique de décoration de la céramique africaine qui consiste à rouler sur la surface humide des récipients des objets communément appelés 'roulettes'. Cette technique *a priori* très simple connaît de multiples variantes : une large gamme d'objets peut être employée comme roulette, non seulement pour réaliser des impressions roulées, mais également des impressions simples, pivotées, etc. Les décors à la roulette sont attestés archéologiquement depuis des millénaires, et l'on observe encore l'usage d'un large éventail de roulettes en Afrique contemporaine, celui-ci comprenant notamment des cordelettes torsadées, des fibres végétales pliées, des cylindres de bois gravé, des os de poissons, des bigoudis ou des ressorts… Si, jusqu'au milieu du vingtième siècle, l'impression à la roulette apparaissait encore comme l'une des plus grandes '*success story*' dans l'histoire du décor céramique en Afrique (Gosselain 2000; Livingstone Smith 2007), son usage est actuellement en déclin. Ceci est dû non seulement au remplacement de la poterie par des récipients en métal et en plastique, mais aussi à une perte de popularité face à de nouvelles modes décoratives, comme les motifs peints. Notre ouvrage concerne donc une technique ancienne qui perdure encore aujourd'hui. Le fait mérite d'être souligné, car il confère au continent africain une position exceptionnelle pour l'étude des roulettes. Dans les autres régions du monde où cette technique fut utilisée par le passé, il n'en existe aucune survivance moderne. Les roulettes africaines constituent donc l'un des fils qui relie le passé au présent. Elles nous permettent aussi d'explorer des questions liées au contexte social de fabrication et d'usage d'objets ornementaux, de tester de nouvelles hypothèses dans l'étude de la culture matérielle et d'aborder un pan énorme de l'histoire culturelle africaine.

Destiné à améliorer notre compréhension des décors imprimés, tout particulièrement en Afrique de l'Ouest, notre ouvrage arrive à un moment opportun dans les études céramiques. Ce champ d'étude a notamment connu d'importants débats relatifs à la question du 'style', dont nous proposons plus bas une brève synthèse.

Ces dernières décennies, les anthropologues et les ethnoarchéologues se sont intéressés à des attributs de la poterie moins visibles que les styles décoratifs – par exemple, les techniques de façonnage. La nature des données archéologiques est telle que les variables décoratives restent néanmoins les principales sources d'informations

stylistiques auxquelles on a accès. Maintenant que les approches théoriques tendent à envisager la décoration comme un 'comportement technique' parmi d'autres et considèrent que les aspects visuels du style ne servent pas nécessairement à transmettre délibérément des informations, nous pouvons porter un regard neuf sur la décoration par impression roulée. Nous disposons, en outre, d'une base de données ethnographiques considérablement enrichie par de récents travaux ethnographiques et ethnoarchéologiques, parmi lesquels on peut citer la 'Mission Archéologique et Ethnoarchéologique Suisse en Afrique de l'Ouest' (Gallay et Huysecom 1991 ; Gallay *et al.* 1996, 1998 ; Mayor 2005, *sous presse* ; Mayor *et al.* 2005), le 'Projet Céramiques et Sociétés' (Gosselain *et al.* 1996 ; Gosselain 2000, 2001 ; Livingstone Smith 2007), et le 'Mandara Archaeological Project' (David et MacEachern 1988, David et Sterner 1989, David 1998).

Une exigence essentielle est évidemment de bénéficier d'une connaissance détaillée de la nature et de l'usage des outils auxquels nous sommes confrontés. Cela n'a pas toujours été le cas dans l'élaboration des typologies céramiques, qui constituent pourtant une base fondamentale des travaux archéologiques en Afrique. Même les décors imprimés des poteries du Sahara, qui comptent parmi les plus anciennes du monde (10 000–8 000 BP), ont parfois été approchées de manière simplement descriptive, les chercheurs se bornant à décrire l'apparence du décor plutôt que d'en reconstituer le mode de réalisation. Le problème est particulièrement sensible dans le cas des roulettes constituées d'une cordelette enroulée, dont l'apparition continue à faire l'objet d'hypothèses divergentes. Les raisons d'une telle impasse peuvent être attribuées à des différences dans les pratiques analytiques des chercheurs. Nous ne partageons pas l'opinion d'Isabella Caneva lorsqu'elle affirme:

> "*we do not think it is a good strategy to describe decorations through the examination of the instruments used to make them… we think that it is hardly possible to reconstruct (or even to imagine) the entire range of tools which might have been used*" (Caneva 1983, 166).

On risque en effet de rester prisonniers de termes vagues comme 'dotted wavy line', qui servent de fossiles directeurs, mais restent peu compris (Mohammed Ali et Khabir 2003 ; Manning 2009), voire même inappropriés dans certaines régions, où ce n'est pas l'absence ou la présence d'un certain type de décoration qui est significative, mais sa fréquence. Nous devons impérativement construire nos analyses sur des assemblages céramiques aussi vastes que possible et, surtout, utiliser des termes classificatoires qui soient descriptifs, systématiques, et compréhensibles par l'ensemble des chercheurs. La description de l'apparence visuelle de la décoration ne peut suffire : il faut également chercher à reconstituer l'outil et son mode d'utilisation.

Une standardisation des termes s'impose aussi pour envisager des comparaisons pertinentes entre régions. La carte archéologique actuelle de l'Afrique est le fruit du travail de nombreuses équipes employant des terminologies et des méthodologies disparates. Le nombre de recherches portant sur le passé de l'Afrique augmentant rapidement, le temps est venu d'établir des bases solides et rigoureuses, qui puissent transcender les frontières des écoles de pensée régionales, linguistiques et intellectuelles. Notre ouvrage souhaite contribuer à cette construction. Toutefois, si la démarche vise avant tout à l'amélioration des caractérisations archéologiques, elle est indissociable,

à nos yeux, de l'étude des décors imprimés actuels, et des modes de fabrication et d'utilisation des roulettes en contexte ethnographique.

Au final, le présent volume se distingue à deux niveaux au moins des travaux existants:

- Il envisage l'outil responsable d'une décoration particulière, plutôt que l'apparence visuelle de la décoration qui en résulte. L'approche privilégie donc la 'cause' sur 'l'effet', ce qui nous a amène à développer une classification des roulettes fondée sur une mise en ordre préalable des données ethnographiques.
- Il rassemble un grand nombre d'illustrations de céramiques imprimées issues de contextes archéologiques. Jusqu'à présent, de tels documents se trouvaient dispersés dans une multitude de publications et étaient de qualité variable, ce qui entravait le développement de comparaisons sérieuses.

Une analyse privilégiant la compréhension de l'outil, combinée à une présentation iconographique riche et de qualité, constituent pour nous la seule façon de cerner les caractéristiques et les variantes des différents types de décorations imprimées à la roulettes – et, ainsi, le meilleur moyen d'identifier d'éventuelles ruptures ou continuités entre les types.

Les roulettes, témoins du style individuel et social

L'étude des roulettes, objets culturels par excellence, touche à la notion-clef du style. La définition du 'style' en archéologie est une question récurrente, largement discutée par les spécialistes, sur un plan à la fois théorique et méthodologique. Les études céramiques y ont occupé une place de premier rang. Ici, notre ambition n'est pas d'ajouter une voix supplémentaire à ces débats : le lecteur se réfèrera à la littérature existante (par exemple Carr et Nietzel 1995 ; David et Kramer 2001, 177–183 ; Hegmon 1998 ; Gosselain 2002 ; Martinelli 2005 ; Haour et Manning *in prep.*). Mais un volume comme le nôtre, qui préconise la classification systématique des roulettes, ne peut pour autant faire complètement l'impasse sur le cadre théorique dans lequel se développe l'étude des techniques décoratives et des caractéristiques stylistiques de la céramique.

La question de ce qu'est le 'style' en archéologie reste par ailleurs ouverte, malgré les débats qu'elle a engendrés. Avant les années 1960–1970, elle ne constituait pas une préoccupation majeure. Le style était associé à tout ce qui n'était pas fonctionnel et tout particulièrement les aspects ornementaux. Les styles céramiques, perçus comme des adaptations 'extra-somatiques' à l'environnement, constituaient des témoins passifs de normes culturelles et étaient donc censés permettre d'approcher d'anciennes frontières culturelles.

Depuis une quarantaine d'années, l'archéologie est entrée dans une nouvelle phase, caractérisée par une collaboration plus soutenue avec l'anthropologie. L'un des bénéfices a été de mieux saisir ce que le style matériel pouvait apporter comme information sur l'identité sociale. Les travaux de Deetz (1968), Hill (1970, 1972) et Longacre (1964), par exemple, constituent une forme de 'sociologie céramique' fondée sur l'hypothèse que l'organisation matrilinéaire de la production céramique dans les sociétés historiques et

contemporaines du sud-ouest américain trouve ses racines dans la préhistoire. Toutefois, les 'styles céramiques' envisagés ici se réduisent à de simples attributs décoratifs : l'articulation de ces attributs avec la notion de style, et leurs relations avec des contextes culturels spécifiques n'est pas envisagée. Tout en ouvrant des perspectives positives dans l'étude de la culture matérielle et de l'identité sociale, cette sociologie céramique reste essentiellement positiviste dans son approche.

Deux concepts influents vont émerger par la suite, qui bouleversent complètement les approches archéologiques du style. Hegmon (1998, 264) les désigne sous les appellations de '*Style has function*' et '*Technology has style*'.

Le premier de ces concepts met l'accent sur le rôle actif des individus dans les processus de transformation sociale. Wobst (1977) suggère que le style possède une fonction active dans la constitution des identités et qu'il est délibérément manipulé par les individus dans le cadre de transmissions d'informations culturelles. Cette approche, qui associe enfin le style et les systèmes sociaux, donne naissance à de nouvelles études, qui mettent désormais l'accent sur la constitution active du style matériel (Hodder 1982, 1986 ; Miller 1985 ; Sackett 1985). Puisqu'il ne reflète plus des blocs culturels de façon passive, mais est fondamentalement contingent, le style permet d'approcher la diversité culturelle et la manière dont celle-ci est socialement constituée et maintenue. Toutefois, cette nouvelle perspective qui envisage le style comme une stratégie délibérée d'informations en vient parfois à dissocier l'objet du processus de fabrication, et le pot du potier.

Au moment où sort l'article de Wobst paraît également un volume édité par Lechtman et Merrill (1977), dans lequel les contributeurs développent une autre vision du style et de sa relation avec l'identité sociale en archéologie. La première partie du livre examine la notion de 'style technologique' et la préface décrit la technologie dans des termes qui font clairement écho à la façon dont une série d'anthropologues et d'archéologues français envisagent les techniques en tant qu'actions socialisées sur la matière (Leroi-Gourhan 1943). Cette nouvelle approche 'technologique' du style en archéologie s'est constituée partiellement sur un rejet de la théorie de l'échange d'informations proposée par Wobst (voir par exemple Lemonnier 1986, 1992 ; Pfaffenberger 1992 ; Dietler et Herbich 1998 ; Hegmon 1998 ; Dobres 2000). Celle-ci est critiquée pour son caractère anhistorique et fondamentalement fonctionnaliste, les individus paraissant opérer une reproduction mécanique et non réflexive des systèmes culturels (Hegmon 1998, 265).

Dans les études céramiques, l'accent mis sur la technologie a permis d'aborder les artefacts dans une perspective plus globale, à travers l'examen de la totalité du processus de manufacture : la chaîne opératoire. Le style y est perçu comme un phénomène polythétique, constitué de nombreuses strates issues des différents stades du processus de fabrication, et susceptible de nous informer sur différents aspects du contexte social. Les attributs techniques, qui comportent des informations stylistiques propres, peuvent être singularisés, analysés sous l'angle des rapports entre matériaux, outils et techniques, et mis en relation avec des questions relatives aux savoirs et à l'identité sociale. Certains aspects du style peuvent jouer un rôle dans la définition de l'identité d'un groupe (c'est le cas de 'l'emblemic style' de Wiessner [1983, 1984]), alors que d'autres reflètent plutôt des expressions individuelles. En ce qui concerne la poterie de l'Afrique sub-saharienne, de telles questions ont été minutieusement explorées par une série de chercheurs

(voir en particulier les travaux de la 'Mission Archéologique et Ethnoarchéologique Suisse en Afrique de l'Ouest', du 'Projet Céramiques et Sociétés', et du 'Mandara Archaeological Project' évoqués plus haut). Ces travaux montrent que les différentes étapes de la fabrication d'une poterie évoluent à des rythmes et selon des modalités différentes. Les méthodes de façonnage, par exemple, tendent à refléter les facettes les plus ancrées de l'identité sociale (parenté, langue, genre, classe), tandis que d'autres attributs stylistiques, plus visibles sur le produit fini (par exemple, la décoration), sont plus fréquemment associés aux aspects situationnels de l'identité (Gallay *et al.* 1998 ; Gosselain 2000, 2001 et références). Contrairement à ce que l'on a pu croire (Arnold 1981; Gosselain 2000), cette situation tient moins au fait que les techniques de façonnage reposent sur des habiletés motrices apprises en bas âge et difficile à modifier par la suite, qu'aux relations sociales qui se nouent à travers l'apprentissage et durant la pratique (d'après Lave 1996; Lave et Wenger 1991). La technique de façonnage est ainsi considérée par ceux qui s'en servent comme un 'héritage' qui matérialise l'affiliation sociale (Gosselain 2008ab). D'autres éléments du répertoire technique peuvent, de leur côté, être perçus comme des moyens de définir les liens sociaux plus ponctuels et de négocier sa position dans une communauté d'artisans (Gosselain 2008ab).

Cette idée que les objets possèdent une biographie, intimement mêlée à celle des personnes qui les fabriquent et les utilisent, et qui englobe de multiples aspects de l'univers culturel, fait écho au courant de pensée archéologique dit 'post-processualiste'. Fondé sur des études anthropologiques, ce courant envisage, par exemple, l'identité ethnique comme un processus dynamique, qui implique une négociation continuelle de la part des acteurs. Malgré cette fluidité, les recherches ethnoarchéologiques continuent à montrer que l'identité ethnique est une ressource essentielle pour les individus et que les facettes de l'identité sociale peuvent être reflétées dans la culture matérielle (Gallay 1991–92; Gallay *et al.* 1996; Gosselain 2001, 2008ab). Face à ces développements théoriques récents, il ne fait pas de doute que les archéologues aient beaucoup à apprendre, mais également qu'ils puissent apporter leur contribution. Une leçon importante, cruciale pour ce volume, est que les artisans contemporains accordent toujours une grande attention au style technique. D'une façon générale, les études ethnographiques et historiques montrent par ailleurs que les 'traditions céramiques' n'évoluent pas chaotiquement, au fil de contacts imprévisibles entre les personnes, ou de la diffusion mécanique de leurs éléments constitutifs. Elles sont toujours fortement canalisées, à la fois au plan individuel et collectif. Il est évident que si les artisans et leurs clients accordent eux-mêmes une signification sociale au processus de manufacture, les archéologues doivent également s'en soucier !

En ce qui concerne cette 'canalisation des éléments' dans le domaine des pratiques décoratives, une distinction cruciale peut être faite entre la perception visuelle – attribut saillant, qui peut être emprunté et reproduit à travers les frontières culturelles – et le savoir relatif à sa réalisation. Les enquêtes ethnographiques montrent que les potiers réinterprètent les motifs décoratifs inconnus (qui constituent ce que Wenger [1998, 111] appelle des 'réifications non accompagnées') en fonction de leurs propres connaissances techniques. Notre volume illustre l'immense variabilité des roulettes en Afrique subsaharienne. Si certaines (par exemple les cordelettes torsadées) sont faciles à fabriquer, à utiliser, à identifier sur le produit fini, et donc à imiter, d'autres (comme les fibres

plates tressées sur âme) sont des constructions complexes, difficiles à reproduire pour l'observateur non initié. La diffusion de tels outils à travers le temps et l'espace témoigne donc peut-être de liens plus étroits entre les communautés d'artisans que celle d'autres catégories de roulettes. De même, une distribution isolée d'outils ou de techniques décoratives reflète éventuellement des ruptures dans les interactions sociales. En proposant une classification systématique et détaillée des roulettes, qui envisage à la fois les matériaux constitutifs, le mode de construction et le mode de fonctionnement, notre ouvrage vise à dépasser le simple exercice typologique pour ouvrir de nouvelles voies dans l'analyse céramique.

On ne peut en effet espérer explorer les rapports complexes entre la variabilité décorative et l'identité sociale sans avoir atteint un niveau de détail satisfaisant dans la reconnaissance des types des roulettes. Stewart (1993) a précédemment encouragé les archéologues à explorer comment et pourquoi les traits diffusent de groupe en groupe, plutôt que de les considérer comme éléments de définition d'un groupe particulier. Nous espérons que notre volume nourrira les débats sur l'association entre roulettes et personnes – association qui est loin d'être simple ou univoque (comparer, par exemple, Herbich [1987] avec Siiriaïnen [1984]).

Nous n'arriverons pas ici à clôturer le dossier relatif à l'exploitation du décor roulé en archéologie africaine ; mais nous pouvons au moins contribuer à explorer le potentiel et les limitations des objets qui y sont associés, lesquels comptent parmi les techniques ornementales les plus visibles de la préhistoire sub-saharienne.

L'identification et la classification des roulettes : études antérieures

Les roulettes africaines font l'objet de recherches depuis des décennies et offrent donc une perspective historique sur une question cruciale en archéologie : la construction et l'usage des typologies. L'utilisation de roulettes est reconnue de longue date. Par exemple, Hamy (1909, 392) soulignait déjà l'absence de telles impressions dans l'assemblage céramique de l'abri sous roche de Kakimbon, en Guinée. Des préhistoriens, tels que Zeltner (1915) et Hubert (*et al*. 1921), ont exploité des données relatives aux céramiques contemporaines pour interpréter les poteries préhistoriques. Hubert *et al.* (1921) ont même entrepris des enquêtes 'paléo-ethnographiques' pour établir une typologie décorative de la céramique ancienne de Mauritanie. Au sein de cette typologie, les roulettes constituent une catégorie à part entière, sans distinction interne. Dans leur étude de la céramique des sites 'Sao' du Bassin tchadien, Griaule et Lebeuf (1948) approfondissent l'analyse, en reconnaissant que divers objets en fibres ont été employés, et que leur mode d'application peut varier. En Afrique orientale et centrale, l'usage archéologique de roulettes est également reconnu. Cependant cette catégorie ne fait pas l'objet de subdivisions (voir Hiernauxet Maquet 1956, 1960 ; Posnansky 1961 ; Sutton 1964).

Plutôt que de s'efforcer d'identifier les outils qui en sont à l'origine, certains archéologues se bornent par ailleurs à décrire l'apparence des décors céramiques, justifiant ce choix par le manque de données ethnographiques disponible (voir par exemple Effah-Gyamfi 1981, 51, n.4 ; Connah et Daniels 2003, 41 ; Caneva 1983, 166).

En 1966, la première tentative de classification extensive de la poterie saharienne et nord-africaine voit le jour. Se fondant sur des expérimentations et des observations archéologiques, Camps-Fabrer (1966) reconnaît trois types de roulettes : la roulette tressée, le peigne fileté et l'épi végétal. Son analyse se focalise toutefois sur d'autres objets que les roulettes, comme les peignes et stylets. Peu après, une étude ethnoarchéologique, menée par Gallay (1970) au Mali, révèle l'existence de plusieurs classes de roulette. Cette typologie, émanant d'observations ethnographiques, est appliquée ensuite à des céramiques archéologiques provenant des falaises de Bandiagara-Dyoundé (Gallay 1981).

La fin des années 1970 voit une recrudescence des analyses classificatoires, influencée partiellement par les préceptes de la 'New Archaeology' (qui met alors l'accent sur la classification et la quantification systématique des traits), mais également par le développement des recherches ethnoarchéologiques. Les apports les plus importants, dus à Bedaux (*et al*. 1978) et aux McIntosh (S. McIntosh et R. McIntosh 1980), portent sur le Mali central. Bedaux *et al*. (1978), s'inspirant en partie des travaux expérimentaux de De Meulemeester (1975) sur des matériaux du Nigeria, proposent une classification qui comporte neuf types de roulette en cordelette, dont une roulette de fibres plates (*cordon*), une roulette 'de brins tressés', et quatre types de cordelette tressée. Même si cette liste reste incomplète et la terminologie peu adéquate, elle représente la première description détaillée de roulettes en cordelette, appliquée à l'analyse de la céramique de deux tells du Delta Intérieur du Niger (Mali). Son utilité va être démontrée ultérieurement dans l'analyse d'un assemblage de poteries Tellem, avec des références au contexte ethnographique (Bedaux et Lange 1983).

Parallèlement, S. McIntosh est confrontée à l'incroyable variété des impressions de roulettes en cordelette et en fibres plates sur le site de Jenné-jeno. Sa première typologie (S. McIntosh et R. McIntosh 1980, 112–157) reconnaît six types de roulette, y compris les cordelettes torsadées et tressées et les roulettes de fibre plate, mais n'apporte pas d'explications techniques. Sa seconde publication comporte une nomenclature plus explicite, avec huit types de roulette supplémentaires, y compris la roulette de cordelette enroulée (voir le tableau comparatif dans S. McIntosh 1995, 137). Des éléments de continuité et de rupture deviennent ainsi apparents sur un seul site et sur une période de 1500 ans. En outre, la typologie de McIntosh prouve son utilité dans d'autres contextes de prospection et de fouilles archéologiques, dont ceux de la Moyenne Vallée du Sénégal (S. McIntosh *et al.* 1992).

Outre la synthèse de Camps-Fabrer (1966) mentionnée plus haut, les africanistes commencent à exploiter d'autres bases de données. La plus connue est l'œuvre de Hurley (1979), qui effectue un travail encyclopédique illustrant plus de 270 types de roulette à base de cordes, sans considérer néanmoins les roulettes constituées de fibres plates. Cette étude a été réalisée en collaboration avec des archéologues japonais, familiers depuis les années 1930 des impressions de cordelette, qui prédominent sur les célèbres poteries Jomon (Kidder 1957; Yamanouchi 1964; Esaka 1968, Sahara 1981).

Une brève note, parue dans *Nyame Akuma* en 1979, encourage parallèlement au développement d'une approche différente. Soper (1979), qui en est l'auteur, préconise l'établissement d'une classification plus exhaustive des diverses roulettes africaines, un projet qu'il mettra lui-même en pratique en 1985, avec la publication de son article dans

l'*African Archaeological Review*. La typologie simple et logique proposée dans cet article deviendra rapidement un modèle de référence pour les spécialistes de la céramique africaine. Celle-ci s'articule de la façon suivante (Soper 1985, 31–41) :

1. Objets non modifiés (par exemple, les épis de maïs)
2. Roulettes rigides
    a) Bois gravé
    b) Argile ou pierre gravée
3. Roulettes flexibles, dont Soper (1985, 33) note à la fois qu'elles "present the greatest complexity of effect and hence should have the greatest potential for the identification of prehistoric cultural entities", et que cette même complexité semble avoir mystifié ou découragé les rares archéologues qui s'y sont confrontés.
    a) Cordelette (avec les variantes torsadée et nouées)
    b) Fibre plate (avec les variantes nouée et de type 'accordion pleat')
4. Roulettes composites (c'est-à-dire : roulettes de cordelette enroulée)

Cette typologie est critiquable, dans la mesure où elle omet plusieurs types de roulette attestées en contextes archéologiques ou ethnographique. Soper lui-même est bien conscient de ces lacunes, et il souligne, par exemple, que les nombreuses variantes de roulette en fibre plate propres à l'Afrique de l'Ouest restent à être identifiées et analysées dans le détail[1]. L'étude de Soper (1985) est néanmoins la première à poser la question de ce que l'étude des roulettes peut concrètement apporter du point de vue de la reconstitution du passé de l'Afrique.

En Afrique centrale et orientale, où archéologues et linguistes travaillent en étroite collaboration sur la problématique de l'expansion bantoue, l'utilisation de roulettes comme témoins d'anciens groupes ethno-linguistiques est parfois proposée. C'est notamment le cas de Desmedt (1991) qui, en se fondant sur la typologie de Soper (1985), établit un rapport entre différentes catégories de roulettes et différents groupes culturels. Stewart (1993) et Robertshaw (1994) ont critiqué cette association entre techniques décoratives et populations. Au nord de l'Afrique centrale, David et Vidal (1977) s'efforcent par ailleurs de reconstituer l'histoire du peuplement de la région de Bouar, en combinant analyse de culture matérielle, ethnographie comparée et linguistique.

Les quinze dernières années témoignent d'une explosion des recherches consacrées à la roulette, tant du point de vue de la typologie que de l'étude des usages et de la distribution spatiale. En 1996, lors du colloque de la Société des Archéologues Africanistes (SAfA) qui se tenait à Poznan (Pologne), une session consacrée au décors à la roulette a été organisée par Olivier Gosselain et Kevin MacDonald. En 2000 est né le groupe de recherche CERAFIM ('Céramique Africaine Imprimée'), qui rassemble des Africanistes spécialistes de la poterie préhistorique et protohistorique, et qui a déjà organisé deux réunions. On leur doit un important catalogue accessible en ligne (http://cerafim.free.fr), établi suivant le modèle de classification en 'arborescence' de Caneva (Caneva et Marks 1990) et destiné à classer les motifs en fonction des techniques de réalisation (Langlois 2004 ; Gallin 2008 ; numéro spécial de *Préhistoire Anthropologie Méditerranéennes* 2004, no. 13). Le champ couvert est vaste : il comprend les décors au peigne aussi bien que ceux à la roulette, et embrasse une région qui s'étend de la Mauritanie à la Vallée du Nil et à Djibouti, via le Maghreb et certaines parties du Sahel.

La question du style occupe une place centrale dans cette approche, celle-ci tenant compte des 'grammaires ornementales', c'est-à-dire du processus de constitution des motifs par combinaison d'impressions. Le rythme des réunions et des publications de ce groupe reste néanmoins très lent.

Dans la Boucle du Niger, Mayor (Mayor 2005, *sous presse* ; Mayor *et al.* 2005) a développé une approche 'actualiste', fondée sur la mise en relation des données ethnographiques et archéologiques disponibles. L'objectif est de retracer l'histoire culturelle de certains décors imprimés à la roulette et des techniques utilisées pour façonner les poteries, en relation avec les ensembles ethnolinguistiques régionaux, ce qui implique de réinterpréter et de raffiner l'analyse des assemblages archéologiques. En ce qui concerne l'étude générale des roulettes, envisagées dans une perspective régionale ou continentale, on mentionnera les synthèses de Gosselain (2000) et Livingstone Smith (2007), qui comparent la distribution et la propagation spatiales des roulettes en fibres souples et en bois, ainsi que celle de Langlois (2004), consacrée à la classification et à la distribution des roulettes dans le Bassin du lac Tchad. Enfin, du point de vue des définitions typologiques dans les monographies archéologiques, des avancées considérables ont été faites grâce aux descriptions minutieuses proposées par certains chercheurs, qui établissent par ailleurs leurs catégories sur base de celles qui ont été précédemment proposées, ce qui évite de réinventer constamment la roue (voir en particulier Wiesmüller 2001 et Schmidt *et al.* 2005, 226–227).

En résumé, les recherches consacrées aux roulettes africaines ont une longue histoire, dont l'évolution suit à bien des égards celle des disciplines archéologique et anthropologique. La première phase procède par à-coups, en fonction des intérêts spécifiques et des compétences des chercheurs individuels. La seconde période témoigne d'une prise en compte graduelle de la diversité des roulettes et de l'élaboration de typologies de plus en plus détaillées. Enfin, depuis une quinzaine d'années, nous assistons aux premières tentatives de synthèse, rendues possibles par la multiplication des données et une sophistication théorique accrue. Notre ouvrage s'inscrit dans cette trajectoire : nous espérons qu'il suscitera des débats et engendrera de futures études de terrain consacrées aux roulettes, tant en Afrique que dans d'autres parties du monde.

Les roulettes hors du continent africain

Il est utile de rappeler que l'utilisation de roulettes pour orner la poterie relève d'un phénomène global. C'est notamment le cas des outils en fibres, bien documentés dans la littérature.

À ce jour, les plus anciens témoignages d'utilisation de roulettes en fibre nous viennent de la culture Jomon, au Japon, et datent d'environ 9500 ans (Kenrick 1995, 47). Le terme 'Jomon' signifie d'ailleurs 'marqué à la cordelette'. Il semble qu'une extraordinaire variété de roulettes en cordelette existait déjà dans les phases initiales de cette culture céramique, celle-ci incluant des variantes de type 'torsadée' et 'enroulée'.

Depuis les travaux pionniers de Yamanouchi (1964), la typologie de ces roulettes a été développée par Hurley (1979) et Sahara (1981). Ce n'est toutefois qu'au Japon, en Amérique du Nord et en Afrique que des subdivisions détaillées ont été entreprises.

Considérons l'exemple de la poterie préhistorique du sud de la Chine : la présence de céramiques décrites comme 'cordées' y est attestée il y a environ 8000 ans (Chui-Mei 1984). Cependant, la nature des motifs n'est pas précisée, et notre examen des planches inclues dans la publication suggère que les décors consistent surtout en impressions de textiles ou de vanneries. Seuls quelques tessons pourraient comporter la marque de roulettes de fibres enroulées sur âme. Détail intéressant : l'auteur observe que la décoration à base de cordelette persiste aujourd'hui dans le Yunnan (Chui-Mei 1984, 299). Plus au nord, en Sibérie, des céramiques décrites comme étant 'marquées à la corde' sont associées à des dates très anciennes, de l'ordre de 10 600–9 900 ans pour le site de Goncharka (Kuzmin et Orlova 2000). Les auteurs ne précisent malheureusement pas la nature des décors et il faut noter que des impressions de cordelette bien identifiées ('cord impressed' et 'net and string impressed ceramics', Kuzmin et Orlova 2000, 361) ne sont attestées dans la région que deux millénaires plus tard. Dans une synthèse qui couvre la Chine, l'Inde, la Sibérie et le Japon, Kharakwala *et al.* (2004) proposent une éventuelle association des céramiques décorées à la corde avec la riziculture. Malgré quelques confusions dans leurs hypothèses, leur travail démontre clairement que la poterie décorée à la roulette de fibre était devenue très répandue en Asie orientale avant le troisième millénaire BC.

La plupart des études relatives à la poterie d'Asie orientale restent peu spécifiques quand elles évoquent les céramiques 'marquées à la corde'. S'agit-il d'impressions de textiles, de battoirs couverts de textiles, d'impressions simples de cordes, ou de cordelettes roulées ? Et en quoi consistent les fibres ? Une exception notable à cette tendance à regrouper toutes les impressions de fibres sans tenir compte de leur exécution technique est le travail que O. K. Singh (1998–1999) consacre à la poterie de Manipur. Cet auteur se fonde aussi sur des enquêtes ethnoarchéologiques pour faciliter l'interprétation des céramiques ornées de motifs linéaires et entrecroisés, associées à des contextes datés du milieu du deuxième millénaire BC. Sa conclusion est que les poteries ont été décorées à l'aide de battoirs autour desquels avaient été enroulées des cordes – technique qui paraît avoir été assez commune en dehors du Japon et de l'Afrique.

Le terme 'roulette' a souvent été utilisé pour décrire des objets plus correctement appelés 'molettes' ou 'disques crénelés'. C'est le cas en archéologie européenne et méditerranéenne. Dans ces régions, il existe néanmoins des impressions de roulette de cordelette au sens propre du terme. C'est le cas aux quatrième et troisième millénaire avant J-C en Europe centrale ('Corded Ware', 'Schnurkeramikkultur'), en Europe du Nord et en Grande-Bretagne (certains types de 'Grooved Ware') (Andersen 1989; Mallory 1997; Hamilton et Whittle 1999; Manby 1999). Ailleurs, les décorations ont apparemment été mal décrites ou mal interprétées (voir, par exemple, le cas des poteries exhumées dans un site au nord-ouest de la Russie, dont le décor est décrit par Patrushev [1992] comme 'spun-speckled impressed pottery').

Dans le Nouveau Monde, les poteries décorées à l'aide de fibres apparaissent à une date plus tardive. Dès 1884, W. H. Holmes avait noté l'existence d'impressions de fibres roulées et de textiles, mais ce domaine d'études est resté longtemps inexploité. Par exemple, le travail de Ritchie et MacNeish (1949) sur la poterie préhistorique de l'état de New York se limite à une identification de trois larges catégories d'impressions – roulette de cordelette enroulée sur âme en bois, impression simple de cordelette, et

battoirs à cordes – avec des subdivisons relatives au positionnement ou à la direction des impressions. Des travaux expérimentaux ont été menés par Rachlin (1955) et Quimby (1961) pour tenter de différencier les impressions de textiles de celles de battoirs à cordes, mais il a fallut attendre l'ouvrage de Hurley (1979), évoqué plus haut, pour voir émerger un système de classification de portée plus large.

Structure du livre

Notre ouvrage se divise en trois parties complémentaires.

La **Section 1** fournit des informations ethnographiques sur la fabrication et l'usage des roulettes, et propose une classification systématique, utilisée dans l'ensemble du volume. Cette approche, qui met l'accent sur les outils de décoration plutôt que sur les décorations elles-mêmes, est l'une des principales originalités de notre ouvrage. La classification s'articule autour de trois éléments : le matériau constituant la roulette (bois, fibre plate, cordelette, etc.), la manipulation imposée à ce matériau pour réaliser la roulette (torsion, tressage, nouage, enroulement, etc.) et le fonctionnement de l'outil (impression roulée, posée, basculée, etc.). De nombreux exemples d'outils récemment collectés sur le terrain ou issus de collections de musées illustrent la classification et sont systématiquement accompagnés de leurs impressions. Simple et logique, la classification proposée offre un cadre d'analyse et de description des roulettes qui peut facilement être transposé à d'autres contextes géographiques.

Si la prise en compte des variantes modernes de la roulette permet souvent de bien saisir l'ampleur de la diversité existante, l'archéologue doit pourtant tenter d'identifier ces objets pour les périodes passées au départ des seules impressions. C'est la raison pour laquelle la **Section 2** fait le lien entre les données ethnographiques et les données archéologiques, en proposant une méthode d'analyse applicable au matériel archéologique. Celle-ci se fonde sur l'identification de la partie agissante de l'outil et vise à déceler les répétitions ou les irrégularités dans les impressions, afin de permettre une reconstitution de l'outil et de son mode d'utilisation.

La **Section 3** est consacrée aux exemples archéologiques de poterie décorée à la roulette. Elle vise à fournir un référentiel pour l'identification des céramiques archéologiques imprimées, en présentant des tessons issus de sites sub-sahariens de périodes très différentes. Nous avons choisi d'illustrer les impressions reconnues sur la base du référentiel ethnographique, mais il est clair que beaucoup restent inconnues en contexte ethnographique – surtout dans la catégorie des roulettes 'composites', ou sur âme – ce qui montre que les artisans du passé ont employé des techniques aujourd'hui disparues. Dans ce cas, seule l'expérimentation offre une possibilité de reconstitution plausible de l'outil.

Directions pour le futur

En achevant notre volume, nous pouvons déjà envisager plusieurs voies de recherches pour le futur.

Les enquêtes menées sur le terrain devront viser à mieux documenter les procédés de fabrication des roulettes et la façon dont ils sont appris par les individus, avant que les techniques disparaissent. Contrairement aux récipients qu'elles contribuent à décorer, les roulettes elles-mêmes n'ont que peu retenu l'attention des chercheurs et n'ont pas été analysée dans une perspective de chaîne opératoire. Il nous reste de ce fait beaucoup de choses à découvrir sur la fabrication et l'usage des roulettes, et, plus largement, sur leurs relations avec d'autres éléments de la culture matérielle. Une piste intéressante serait de se pencher sur les protagonistes des apprentissages relatifs à la fabrication des roulettes. De voir en quoi ceux-ci sont facilités par la pratique d'activités apparentées comme la fabrication de cordes, la sparterie, la coiffure ou le tissage et s'ils commencent dès l'enfance. Les jeux d'enfants représentent à cet égard un domaine particulièrement négligé. En portant l'attention sur les artisans, il est possible également d'explorer les causes et la signification de la variabilité inhérente à des catégories spécifiques de roulette, de déterminer si la fabrication et l'usage de roulettes constitue une activité saisonnière, s'il existe une relation avec l'usage de fibres végétales comme dégraissant, et d'évaluer par ailleurs la longévité de ces outils de potier.

De telles analyses sont fondamentales pour faire la lumière sur l'association tant discutée entre roulettes et groupes ethnolinguistiques. À ce stade, il est clair que nous ne pouvons plus nous limiter à l'étude de grandes catégories d'outils : il nous faut disposer de données portant sur la distribution d'outils singuliers, et ce d'un point de vue aussi bien synchronique que diachronique. Ce changement d'échelle dans les analyses est susceptible de nous apporter des informations essentielles sur la façon dont se propagent les connaissances et compétences relatives à la fabrication des roulettes.

De telles données sont importantes dans une perspective où les impressions à la roulette constituent un axe central des reconstructions archéologiques. Mais les archéologues ont beaucoup à faire de leur côté également. Nous devons impérativement continuer à documenter les séquences et les distributions de la poterie imprimée. L'uniformité dans la classification des roulettes prônée par ce volume facilitera incontestablement les synthèses futures. On peut en attendre des répercussions majeures, tant en ce qui concerne l'identification de processus sociaux locaux que la reconstitution d'interactions plus larges à travers l'espace et le temps.

Notes

1 Voir à ce sujet, Section 3, ce volume : Haour et Keita; Haour; Mayor.

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SECTION 1

This section draws upon information from ethnographic examples of roulette fabrication and usage in sub-Saharan Africa, to set the initial foundations of a systematic classificatory framework for these tools. The simple and elegant framework adopted here for the categorisation of roulettes is articulated around three key characteristics: the material of which the roulette is made (wood, strip, cord, etc.), the manipulation operated on it (twisting, knotting, wrapping, etc.), and finally the manner in which it is applied to the body of the vessel (rolled, single-impressed, rocked, etc.). A distinction is made between simple roulettes, roulettes on a core (be it 'continuous' or 'independent'), roulettes made from modified materials, and finally unmodified objects used as roulettes. Examples drawn from recent fieldwork and from museum collections are illustrated here with their impressions.

Modern roulettes in sub-Saharan Africa

Alexandre Livingstone Smith, Olivier Gosselain, Anne Mayor and Ndèye Sokhna Guèye

Introduction: classification and nomenclature of African roulettes

For millennia, across much of the African continent, tools have been rolled across the wet paste of clay vessels to imprint motifs with the principal purpose of decoration. We know that these tools are very diverse in terms of materials and the ways in which they were made, and that they create an extraordinary palette of motifs. Such tools are still being used in sub-Saharan Africa today; however, it is likely that these known ethnographic materials reflect only a fraction of the potential range.

Research questions take very different directions according to the disciplinary perspective adopted – e.g. archaeological, historical, ethnographic – and the scale of comparison selected. Here we use a primarily archaeological approach, since the focus is above all on facilitating the identification, handling and analysis of informations relating to rolled decorations – and this, *in the absence* of the physical tools that were used. The ultimate objective is to contribute to writing a cultural history of this type of decoration and, on this basis, that of the artisans, users and peoples with which it is associated. But for now we confine ourselves to a more modest, albeit crucial, level: the characterisation and classification of tools and of the motifs that they produced.

As discussed in the introduction to this volume, Africanist archaeologists have been faced with this problem for more than a century and have sought to provide a structural response to it for over forty years. In essence, we are seeking to solve the classic equation in ceramic typology:

[tool α + mode of action β] / state of the material δ = motif x

One method involves focusing on the resulting motifs, and describing their most salient traits using words borrowed from everyday language and generally associated with other semantic fields: e.g. 'wave', 'zig-zag', 'grains in relief', 'alternating ears' etc. We can also use codes combining letters and numbers, organised, if required, following a hierarchical system. For example, we could have **I** for 'impression', **Ir** for 'rolled impression', **Ir1** for 'rolled impression with fibre motifs', **Ir1a** for 'rolled impression of fibres in a herringbone pattern', etc.

Whatever the case may be, the lack of a shared descriptive system and the manner

Roulettes modernes d'Afrique sub-saharienne

Alexandre Livingstone Smith, Olivier Gosselain, Anne Mayor et Ndèye Sokhna Guèye

Introduction: classification et nomenclature des roulettes africaines

Depuis des millénaires, dans une vaste région du continent africain, des instruments sont roulés sur la pâte humide des récipients en argile pour y imprimer des motifs, dont la principale fonction est décorative. Très diversifiés du point des matériaux et des modes de fabrication, ces instruments permettent de réaliser une extraordinaire palette de motifs et sont encore en usage en Afrique sub-saharienne aujourd'hui, même s'il paraît vraisemblable que le matériel ethnographique connu ne reflète qu'une fraction des possibilités explorées au cours du temps.

Les questionnements relatifs à leur étude empruntent des voies différentes, selon la perspective adoptée – archéologique, historique, ethnographique – et l'échelle de comparaison. Nous nous plaçons ici dans une perspective essentiellement archéologique, puisqu'il s'agit avant tout de faciliter l'identification, la manipulation et l'analyse des informations relatives aux anciens décors roulés. L'objectif final est de contribuer à écrire une histoire culturelle de cette catégorie de décors et, partant, celle des artisans, des usagers et des peuples auxquels ils sont associés. Mais nous nous limitons pour l'heure à un niveau plus modeste, quoiqu'incontournable : celui de la caractérisation et du classement des outils et des motifs qu'ils permettent de réaliser.

Comme on l'a vu en introduction de ce volume, il y a plus d'un siècle que les archéologues africanistes sont confrontés à ce problème et une quarantaine d'années qu'ils cherchent à y apporter une réponse structurelle. Fondamentalement, il s'agit de résoudre l'équation classique en typologie céramique :

[outil α + mode d'action β] / état de la matière δ = motif x

Une façon de procéder consiste à se focaliser sur les motifs résultants. On peut alors en décrire les caractéristiques les plus saillantes à l'aide de mots empruntés à la langue courante et associés en général à d'autres champs sémantiques : 'vague', 'zig-zag', 'grains en relief', 'épis alternes', etc.… On peut également utiliser des codes combinant lettres et chiffres, et organisés, le cas échéant, suivant un système hiérarchique. On aura, par exemple, **I** pour 'impression', **Ir** pour 'impression roulée', **Ir1** pour 'impression roulée à motifs de fibres', **Ir1a** pour 'impression roulée à motifs de fibres en épis', etc.…

Dans l'un ou l'autre cas, l'absence d'un système de description partagé et le

in which research is carried out – that is to say, often independently and based on unpublished data – lead to enormous disparities in results. Researchers do not work at the same level of detail, do not see the same things, and do not select the same categories of signifier. Communication and comparison of results is thus strongly hindered (see Introduction to this volume). The same problem occurs in approaches that focus on the identification of decorating tools. Once again, methods of reconstruction, referents and nomenclatures are extraordinarily heterogeneous, and the nature of the results varies according to the extent of the ethnographic knowledge of researchers or their ingenuity in constructing experimental reference collections.

To break this deadlock, we need not necessarily start from scratch and reject all existing attempts, but we must begin by establishing order within the muddle of available data, and by laying the foundations for a structural resolution to the problems posed by the analysis of rolled decorative impressions.

Principles of classification

All scientific disciplines are sooner or later confronted by the need to systematise the description and classification of their object of study. An emblematic example is that of living species, for which Linnaeus, in the early eighteenth century, established rules for a classification based on principles of descent, differentiation, inclusion and organisation into a hierarchy using a standardised Latin nomenclature (Meilleur and de Garine 2008, 354). In our case, such principles of classification are not very useful, not only because cultural practices do not operate in the same way as living species, but also because the level of particularistic detail has no common measure with that which confronted Linnaeus. However, other classification systems, particularly those for cultural technology, can be sources of inspiration (e.g. Leroi-Gourhan 1971 [1943]; Haudricourt 1987; Lemonnier 1992).

In an article concerning the nomenclature of agricultural tools, Sigaut (2000, 370–371) discusses principles for the description of a tool. These include three aspects:

- *structure*: material, form, absolute and relative dimensions, weight, symmetries and asymmetries, balance, settings, method of hafting, etc.
- *means of use*: the way in which the tool is put to use, and the effect on the material worked;
- *function*(*s*): range of purposes of the tool's function.

For roulettes, 'means of use' and 'function' are already known. They themselves form the point of entry for our classification, since we consider here only tools rolled on a plastic material to imprint relief motifs (*means of use*), for primarily aesthetic and sometimes functional purposes (e.g., to prevent vessels from slipping) (*function*).

The structure of the tools thus remains the question to be clarified. With respect

fonctionnement même de la recherche, qui fait que l'on travaille souvent indépendamment et sur du matériel inédit, entraînent d'énormes disparités dans les résultats : tous les chercheurs n'adoptent pas le même niveau de détail, ne voient pas les mêmes choses et ne sélectionnent pas les mêmes catégories de signifiants. La communication et la comparaison des résultats s'en trouvent fortement entravées, comme cela a été souligné dans l'introduction. Le problème est pratiquement identique dans le cas des approches centrées sur l'identification des outils de décoration. Ici encore, les méthodes de reconstitution, les référents et les nomenclatures sont extraordinairement hétérogènes, et la nature même des résultats varie suivant l'étendue des connaissances ethnographiques des chercheurs ou l'ingéniosité déployée dans la constitution de collections expérimentales de référence.

Pour sortir de cette impasse, il n'est pas nécessaire de faire table rase des tentatives existantes, mais il est indispensable de commencer par mettre de l'ordre dans le fouillis des informations disponibles et baliser la voie qui mène à une résolution structurelle des problèmes que pose l'analyse des décors par impressions roulées.

Principes de classification

Toutes les disciplines scientifiques sont confrontées tôt au tard à la nécessité de systématiser la description et le classement de leurs objets d'étude. Un cas emblématique est celui des espèces vivantes, pour lesquelles Linné a fixé, au début du dix-huitième siècle, les règles d'une classification fondée sur les principes de descendance, de différenciation, d'inclusion et de hiérarchisation, en se servant d'une nomenclature latine normée (Meilleur et de Garine 2008, 354). Dans notre cas, les principes d'un tel type de classification ne nous sont pas d'un grand secours, non seulement parce que le fonctionnement du monde vivant ne suit pas les mêmes modalités que celui des pratiques culturelles, mais également parce que l'on se situe à un niveau de particularisme sans commune mesure avec la tâche à laquelle s'était attelé Linné. On peut en revanche s'inspirer d'autres systèmes de classification, et tout particulièrement de ceux que proposent la technologie culturelle (par ex. Leroi-Gourhan 1971 [1943] ; Haudricourt 1987 ; Lemonnier 1992).

Dans un article consacré à la nomenclature des outils aratoires, Sigaut (2000, 370–371) rappelle les principes de description des outils. Celle-ci comporte trois plans :

- la *structure* : matériau, forme, dimensions absolues et relatives, poids, symétries et asymétries, équilibre, réglages, dispositif d'emmanchement, etc. ;
- le *fonctionnement* : façon dont l'outil est mis en mouvement et résultats sur la matière travaillée ;
- la ou les *fonction*(*s*) : ensemble des finalités du fonctionnement de l'outil.

Dans le cas des roulettes, 'fonctionnement' et 'fonction' sont déjà connus. Ils constituent même le point d'entrée de notre classification, puisqu'on ne considère ici que les instruments roulés sur un matériau plastique pour y imprimer des motifs en relief (*fonctionnement*), dans un but essentiellement esthétique et parfois fonctionnel (par exemple éviter que les récipients ne glissent des mains) (*fonctions*).

Il nous reste par conséquent à clarifier la structure des outils. En ce qui concerne

to roulettes, the main issues seem to be the *materials* that were employed, and the *manipulation* to which they were subjected. The question of weight, symmetry, balance, settings and hafting do not seem to be relevant, since we are invariably faced with cylindrical objects, put into motion with the palm of the hand or the fingertips. The question of dimensions is of interest, but this information appears to be more useful from the point of view of tool reconstruction (see Section 2) than from that of their classification.

Materials

A preliminary examination of the archaeological and ethnographic data collected in Africa indicates there exist eight categories of materials:

- flexible fibres of vegetal origin;
- wood;
- inflorescences;
- shells;
- bone;
- metal wire;
- synthetic cord (nylon, plastic);
- recycled objects (plastic and/or metal)

The 'flexible fibres of vegetal origin' category – in fact the best represented in Africa – can be divided into at least two sub-categories, depending on whether the tool is made initially from a tuft of fine *twisted fibres* (= 'cord'), or from *flat fibres*, that is to say 'strips'. A second comment: though most roulettes are made from a single material (Table 1.1), some combine different materials. These include roulettes made of twisted fibres and wood, metal wire and wood, or metal wire and a recycled object (e.g., a nail). Such roulettes have often been named 'composite roulettes', a category which regroups roulettes that are made of two constituent elements or more, independently of their nature. As we shall go on to see, we prefer the term 'roulettes on a core' (Table 1.2), which better reflects the technical characteristics of these tools.

Manipulations

We can distinguish methods of manipulation that *assemble* materials through a specific action of entwinement (twisting, knotting, folding, braiding) and those that *alter* the appearance of materials (carving, sculpting, engraving, pokerwork). Manipulations involving assembly concern only flexible materials, mainly fibres of natural origin – whether round or flat in cross-section – as well as metallic and synthetic cords. Manipulation through alteration concerns principally wood and bone, and produces objects with a very similar general appearance: cylinders with relief decoration. It can, however, also relate to vegetal cobs and ears modified by the removal of certain external portions.

Considered from the standpoint of the manipulation of their constituent materials,

les roulettes, les principaux éléments en jeu semblent être les *matériaux* utilisés et leur *manipulation*. La question du poids, de la symétrie, de l'équilibre, des réglages ou de l'emmanchement ne paraît pas pertinente, puisque nous sommes invariablement confrontés à des objets cylindriques, directement mis en mouvement avec la paume de la main ou l'extrémité des doigts. La question des dimensions mérite sans doute de retenir l'attention, mais cette information paraît plus utile du point de vue de la reconstitution des outils (voir Section 2) que de celui de leur classement.

Matériaux

Un examen préliminaire des données archéologiques et ethnographiques collectées sur le continent africain indique que nous sommes en présence de huit catégories de matériaux :

- fibres flexibles d'origine végétale ;
- bois ;
- inflorescences ;
- coquillages ;
- os ;
- fil métallique ;
- fil synthétique (nylon, plastique) ;
- objets récupérés (plastique et/ou métal)

La catégorie des fibres flexibles d'origine végétale – qui est aussi la mieux représentée sur le continent – peut être subdivisée en deux sous-catégories au moins, selon que l'outil est constitué au départ d'une touffe de fines *fibres tordues* (on parle alors de 'cordelette') ou au départ de *fibres plates*. Par ailleurs, la plupart des roulettes sont constituées au départ d'un unique matériau (Table 1.1), mais il en existe aussi qui combinent des matériaux différents : on rencontre ainsi des roulettes mêlant fibres torsadées et bois, fil métallique et bois, ou fil métallique et objet manufacturé (comme par exemple un clou). Ces roulettes ont souvent été désignées comme des 'roulettes composites', catégorie qui regroupe les roulettes faites de deux éléments constitutifs ou plus, indépendamment de la nature de ces éléments. On verra plus loin que nous préférons le terme de *roulettes sur âme* (Table 1.2) qui reflète mieux les caractéristiques techniques de ces outils.

Manipulations

On distinguera les manipulations qui visent à *assembler* les matériaux par une action d'entrelaçage spécifique (torsadage, nouage, pliage, tressage) et celles qui visent à en *altérer* l'apparence (taille, sculpture, gravure, pyrogravure). La première catégorie de manipulation ne concerne que les matériaux flexibles, soit principalement les fibres d'origine naturelle – qu'elles soient de section ronde ou plate – mais aussi les fils métalliques ou synthétiques. Quant à la seconde catégorie, elle concerne principalement le bois et l'os, et contribue à la production d'objets dont l'apparence générale de cylindres à décor en relief est très similaire. Elle peut néanmoins aussi s'appliquer à des épis végétaux, modifiés par ablation de certaines parties.

Envisagées du point de vue de la manipulation des matériaux constitutifs, les roulettes

roulettes can thus seemingly be grouped into three broad categories: (1) assembled (flexible fibres, metallic and synthetic cords); (2) altered (wood, bone, certain inflorescences); (3) not modified (shells, recycled objects, certain inflorescences). Available data suggest that the first category should be divided into sub-categories specifiying the exact nature of the method of assembly (e.g. twisted, knotted, folded or braided).

Material – manipulation systems

Once the elements making up the structure of the roulette have been identified, the next step is to combine them to establish a classificatory scheme. This process of correlation does not always yield a satisfactory scheme, because the characteristics of roulettes do not follow natural laws but rather a plethora of technical, social and historical factors, the combination of which leads to a highly heterogeneous repertoire. The choice and organisation of classificatory parameters must thus be carefully thought out, and be contingent upon the known characteristics of the range of objects analysed and the objectives of the classification. Issues to be resolved then arguably fall into three types:

- some categories of *materials* are associated only with specific *manipulation* categories, so considering them jointly yields no further discriminating information;
- some categories of *materials* and of *methods of manipulation* are much more diverse than others, leading to asymmetry in classification hierarchies. The amplitude in variation can sometimes be such that one might ask to what point it should be documented;
- groups viable at the level of *materials* do not necessarily match those determined at the level of *manipulations*. We must then ask whether one of these aspects should carry more weight that the other, or whether the creation of new subdivisions is warranted.

The establishment of an workable classificatory system thus requires an adjustment of parameters according to their ability to describe the actual diversity of tools, and a simultaneous adjustment of the levels of detail appropriate, depending on the variations in the different tool categories. It is here that we need to define the objective sought and the materials selected in constructing the classification.

Objective and references

The objective pursued here is simple: to characterise and to classify tools and the motifs they create, in order to facilitate their recognition and their comparative analysis in archaeological materials. This aim was already at the centre of the two most significant works focusing on roulettes: Hurley (1979) and Soper (1978; 1985). However, in contrast with – but also thanks to – these two authors, the foundations for our work have already been established. Their contributions, already over a quarter century old, allow us to gauge the value of classifying roulettes, as well as the pitfalls that threaten this enterprise. The work of Hurley (1979), focusing solely on roulettes with cords and round-section

semblent pouvoir se regrouper au final en trois larges catégories : (1) assemblage (fibres flexibles, fils métalliques et synthétique); (2) altération (bois, os, certaines inflorescences); (3) absence de modification (coquillages, objets récupérés, certaines inflorescences). Les données disponibles indiquent qu'il est souhaitable de subdiviser la première catégorie en sous-catégories détaillant la nature précise de l'assemblage (torsade, nouage, pli, tresse).

Système matériau – manipulation

Après avoir caractérisé les éléments constituant la structure des roulettes, l'étape suivante consiste à les combiner pour en établir le classement. Cette mise en corrélation ne fournit pas automatiquement une classification satisfaisante, car les caractéristiques des roulettes ne découlent pas de lois naturelles, mais d'une multitude de facteurs techniques, sociaux et historiques, dont la combinaison engendre un répertoire très hétérogène. Le choix et l'agencement des paramètres de classement doivent donc être raisonnés, c'est-à-dire effectués en fonction des caractéristiques connues du répertoire d'objets analysés et des objectifs de la classification. Il semble alors que les problèmes à résoudre soient de trois ordres :

- certaines catégories de *matériaux* sont univoquement associées à des catégories particulières de *manipulations*, de sorte que leur prise en compte combinée n'apporte aucune information discriminante supplémentaire ;
- certaines catégories de *matériaux* et de *manipulations* connaissent une diversité beaucoup plus prononcée que d'autres, ce qui entraîne des asymétries dans les hiérarchies classificatoires. L'amplitude de variation peut d'ailleurs être telle que la question se pose de savoir jusqu'à quel point en rendre compte ;
- les regroupements opérables au niveau des *matériaux* ne sont pas nécessairement symétriques à ceux que l'on obtient au niveau des *manipulations*. La question se pose alors de savoir si l'un de ces aspects doit l'emporter sur l'autre ou s'il convient de créer de nouvelles subdivisions.

La mise sur pied d'un système de classification opérationnel impose donc que l'on module les paramètres en fonction de leur capacité à rendre compte de la diversité effective des outils, et que l'on module simultanément les niveaux de détail auquel il faut descendre en fonction des variations dont témoignent les différentes catégories d'outil. C'est ici que se pose la question de l'objectif poursuivi et du matériel choisi pour construire la classification.

Objectif et références

L'objectif poursuivi ici est simple: il s'agit de caractériser et de classer les outils et les motifs qu'ils permettent de réaliser, pour en faciliter la reconnaissance et l'analyse comparée au départ du matériel archéologique. Cette volonté se trouvait déjà au cœur des deux travaux les plus importants consacrés aux roulettes, celui de Hurley (1979) et celui de Soper (1978, 1985). Pourtant, contrairement – mais également grâce – à ces deux auteurs, nous ne partons pas désarmés. Leurs contributions, vieilles maintenant d'un quart de siècle, permettent de jauger l'intérêt d'une classification des roulettes, mais également les écueils qui guettent une telle entreprise. Ainsi, le travail de Hurley

vegetal fibres as a foundation, is based on experimental reconstruction and aims to be as exhaustive as possible. Inevitably incomplete compared to the situation prevailing in sub-Saharan Africa, this catalogue is also extraordinarily detailed, involving 271 roulette variants. But the profusion of microvariants often gives the illusion of rigour, and does not eliminate subjective interpretations. The book is also difficult to use, given the quantity of information provided and the global lack of hierarchical organisation. On the plus side, Hurley uses a nomenclature that is accessible and logical, facilitating the exchange of information between researchers.

Much simpler in its design, and including a broader range of tools, Soper's classification (1985) is an 'African' response to Hurley's work. In an earlier version (Soper 1978, 64), antedating Hurley's publication, three categories of roulettes were identified: 'natural objects', 'carved wooden roulettes' and 'cord roulettes', where the latter category was divided into 'twisted' and 'knotted' sub-categories. In the more recent version (Soper 1985, 31), four classes were defined, two of these divided into sub-classes:

(1) unmodified objects
(2) rigid roulettes
    a) carved wood
    b) clay or carved stone
(3) flexible roulettes
    a) string (cord)
    b) strip
(4) composite roulettes

The principal value of Soper's work, other than its attempt at classification, lies in its description of some common prototypes of African roulette, which he named, as had Hurley, according to the materials and the manipulations used in the tools. Some of these names – 'twisted string roulette' [TGR], 'knotted strip roulette' [KPR] – have become common currency among Africanist archaeologists. But this work is not without its failings, one of which being, paradoxically enough, the lack of completeness of the classification proposed. Soper did not sufficiently focus on the existence of variants deriving from particular choices or manipulations of a material within a single tool category. His single 'string' category, for instance, masks a range of variants that are commonly encountered in ethnographic or archaeological material. Moreover, he mixed ethnographic and experimental tools, without justifying how he constructed his catalogue of variants. Finally, familiar as Soper was with material from East Africa, he did not take into consideration the huge variety of tools known in West Africa.

Hurley and Soper represent two attempts at a 'scientific systematisation' of roulettes. Both are based on a characterisation of constituent materials and their manipulations, echoing mainstream classificatory practices in anthropological studies of techniques. Both utilise a partially convergent English-based nomenclature. Many elements of these two classification systems have already been adopted by Africanist archaeologists. However, the objectives of the two authors are not quite the same; while Hurley focused

(1979), uniquement consacré aux roulettes à base de cordes et de fibres rondes, est fondé sur une reconstruction expérimentale aussi exhaustive que possible. Forcément déséquilibré par rapport à la situation qui prévaut en Afrique sub-saharienne, il est aussi extraordinairement détaillé avec ses 271 variantes de roulettes. Néanmoins, la profusion de micro-variantes donne souvent une illusion de rigueur et ne met pas à l'abri d'interprétations subjectives. Sa manipulation est également malaisée, en raison de la quantité d'informations apportées et de l'absence globale de hiérarchisation. En revanche, Hurley utilise une nomenclature accessible et logique, facilitant les échanges d'information entre chercheurs.

Infiniment plus simple dans sa conception et englobant une palette d'outils plus large, la classification de Soper (1985) constitue une réponse 'africaine' aux travaux de Hurley. Dans une première version (Soper 1978, 64), antérieure à la publication de Hurley, trois catégories de roulettes sont reconnues – 'objets naturels', 'roulettes en bois taillées', 'roulettes de corde' – dont la dernière est subdivisée en deux sous-catégories : 'torsadée' et 'nouée'. Dans sa version plus récente (Soper 1985, 31), quatre classes sont établies, et deux d'entre elles subdivisées en sous-classes :

(1) objets non modifiés
(2) roulettes rigides
    a) bois taillé
    b) argile ou pierre taillée
(3) roulettes flexibles
    a) corde
    b) fibre plate
(4) roulettes composites

L'intérêt principal du travail de Soper, outre cette tentative de classement, est la description de quelques prototypes courants de roulettes africaines, auxquels il donne un nom fondé, comme chez Hurley, sur les caractéristiques relatives aux matériaux et à leurs manipulations. Certains de ces noms – 'twisted string roulette' [TGR], 'knotted strip roulette' [KPR] – sont entrés dans le langage courant des archéologues africanistes. Mais ce travail n'est pas sans défaut. L'un d'eux est, paradoxalement, le caractère incomplet de la classification proposée. Tout d'abord, Soper ne souligne pas assez l'existence de variantes imputables au choix ou aux manipulations spécifiques d'un matériau au sein d'une même catégorie d'outil. Sa catégorie 'corde', par exemple, masque une série de variantes couramment reconnues dans le matériel ethnographique ou archéologique. Il mêle aussi outils ethnographiques et outils expérimentaux, sans justifier la façon dont il constitue son catalogue de variantes. Enfin, familier du matériel de l'Afrique de l'Est, il fait l'impasse sur une vaste gamme d'outils observés en Afrique de l'Ouest.

Au final, nous disposons donc de deux tentatives de 'systématique scientifique' des roulettes fondées sur une caractérisation des matériaux constitutifs et de leur manipulation, comme le préconisent les classifications adoptées en technologie culturelle, et utilisant une nomenclature (anglophone) partiellement convergente. De nombreux éléments de ces deux systèmes de classification ont déjà été adoptés par les archéologues africanistes. Cependant, les objectifs des deux auteurs ne sont pas tout à fait symétriques, Hurley mettant l'accent sur la constitution des outils et leur

on the construction of rouletting tools, and their identification from impressions, Soper aimed mainly at classifying and naming them, creating the basis for a cultural history of rolled impressions in Africa.

While improvements can therefore be made, we certainly do not advocate throwing out earlier attempts. On the contrary, the classification we propose here incorporates as much as possible the sub-divisions and elements of nomenclature proposed by Soper and Hurley. What sets us apart from these two authors are the aims both to broaden the range of tools included, and to unify their description and classification.

Looking again at biological taxonomy, the objective of these systematics is not only to reach an exhaustive inventory of species, but also,

> *"par l'usage de règles explicites d'organisation du système de classement et de normes strictes de nomenclature, à attribuer à chaque entité une position unique dans la taxonomie et une dénomination qui permette de transmettre facilement et sans ambiguïté les informations concernant les organismes à d'autres scientifiques, même s'ils n'en sont pas familiers."* (Meilleur and de Garine 2008, 370).

This is why, even if our classification has imposed a series of subjective choices, we have endeavoured to render it as explicit and as rigorous as possible.

An initial endeavour was to identify the details of tool fabrication – a description which may appear tedious to some readers. Without these details, however, it is impossible to develop a *material-manipulation* system of classification that accurately reflects reality and that can allow us to assign a unique position to each class and variant of tool. A second requirement was to broaden the existing nomenclature by following a unique standard, able to explicitly reflect technological information. It is because of this concern, for example, that we have excluded a term such as 'scoubidou', despite its increasing popularity among French-speaking archaeologists: not only is it ambiguous in terms of technique and typology (especially for English-speakers), but it also transgresses the terminological rules of inclusion upon which the naming of most other tools is based. The term 'braided strip roulette (alternate or crossed)' that we prefer in its place is admittedly much more cumbersome, and may seem unnecessarily long, but it has several merits: it fits within a unified system of nomenclature, describes the key technological characteristics of the object, and can be easily translated without any loss of information.

Choice of ethnographic referents

We have just seen that the objective of biological taxonomies, beyond the organisation of a classificatory system and the development of standards of nomenclature, is to conduct an exhaustive inventory of species. There is a parallel here with our project. But what does 'exhaustive' mean in our situation? Does it mean identifying (and classifying) all the tools that may possibly have been used in the past to make rolled impressions on pottery? It is this kind of project that Hurley took on for Jomon pottery, with the advantages and disadvantages discussed above. Rather than such an experimental

identification au départ des impressions, tandis que Soper s'efforce surtout de les classer et de les nommer, et jette les bases d'une histoire culturelle des impressions roulées en Afrique.

S'il y a incontestablement moyen de faire mieux, cet objectif ne nécessite pas de faire table rase des tentatives précédentes. Au contraire, la classification que nous proposons ici incorpore autant que possible les subdivisions et les éléments de nomenclature proposés par Soper et Hurley. Ce qui nous démarque de ces deux auteurs est la volonté à la fois d'élargir le répertoire des outils pris en compte, et d'en unifier la description et le classement.

Pour en revenir aux taxonomies biologiques, on rappellera que l'objectif de la systématique est non seulement de parvenir à un inventaire exhaustif des espèces, mais également,

> "par l'usage de règles explicites d'organisation du système de classement et de normes strictes de nomenclature, à attribuer à chaque entité une position unique dans la taxonomie et une dénomination qui permette de transmettre facilement et sans ambiguïté les informations concernant les organismes à d'autres scientifiques, même s'ils n'en sont pas familiers" (Meilleur et de Garine 2008, 370).

C'est la raison pour laquelle, même si notre classification a imposé une série de choix subjectifs, nous nous sommes efforcés de la rendre aussi explicite et rigoureuse que possible.

Une première nécessité a été de connaître les détails de fabrication des outils – dont la description paraîtra peut-être fastidieuse à certains lecteurs. Mais sans ces détails, il est impossible de développer un système de classification *matériau-manipulation* qui rende compte de la réalité et permette d'assigner à chaque classe et variante d'outil une place unique. Une seconde nécessité a été d'élargir la nomenclature existante en suivant une norme unique, susceptible de refléter explicitement les informations techniques. C'est dans ce souci, par exemple, que nous avons écarté un terme comme 'scoubidou', malgré sa popularité croissante parmi les archéologues francophones : non seulement ambigu sur le plan technique et typologique (surtout pour les anglophones), il rompt également les règles terminologiques d'inclusion sur lesquelles se fonde la dénomination de la majorité des autres outils. Le terme 'roulette de fibres plates tressées (alternes ou croisées)' que nous lui préférons sonne incontestablement moins bien et peut paraître inutilement long. Il a les mérites cependant de s'inscrire dans un système de nomenclature unifié, de révéler les caractéristiques techniques essentielles de l'objet qu'il désigne et de pouvoir être aisément traduit sans perte d'information.

Choix de référents ethnographiques

Nous venons de voir que l'objectif des systématiques botaniques, outre l'organisation d'un système de classement et le développement de normes de nomenclature, est de procéder à un inventaire exhaustif des espèces. Il y a ici un parallèle avec notre projet. Mais que veut dire 'exhaustivité' dans le cas qui nous occupe ? S'agit-il d'identifier (et de classer) tous les outils susceptibles d'avoir été utilisés dans le passé pour réaliser une impression roulée sur la poterie ? C'est à ce genre de projet que s'était attelé Hurley pour la céramique Jomon, avec les avantages et les inconvénients évoqués plus

and deductive methodology, would it be better to use a more ethnographic approach, focusing on the study of tools *actually* used by present-day artisans? But then, what guarantee do we have that the ethnographic present can inform us on *all* possible variants, both in the present and the past? Should we, then, combine experimentation and ethnography, as did Soper?

We do not think there exists an ideal answer to these questions. Rather, it appears that a choice must be made, based foremost on the objectives of the classification. From this point of view, it seems rational to limit ourselves here to ethnographic material collected in Africa. On the one hand, a large part of the classification of roulettes has already been based, from Soper's first attempts onwards, on African tools. It is by virtue of their actual existence and of the known details of their fabrication that certain subdivisions were elaborated. The making of experimental prototypes then aimed (and still aims) at 'filling in the gaps' or refining identifications. The 'ethnographic present' is thus not 'tyrannical'– in the sense intended by Wobst (1978) – but forms the backbone of the classification. Also, Hurley's experimental work, so detailed and abounding that it leads to communication problems, does not encourage us to do the same for African roulettes. We recall that the 271 variants proposed by Hurley concern only those roulettes that we would here classify within the category of round-section vegetal fibres. Should we, then, attempt the same inventory for 'flat fibres' and 'composite tools'? What would we really gain by proposing a classification that includes several hundred putative variants, many of which probably the equivalent of unicorns or dragons in a biological classification? But if this is not the case, where should we place the limits between experimentation that enriches, and experimentation that leads one astray? Frankly, we do not know. And, in fact, we are left even more in the dark by the current state of archaeological identifications, which do not allow us to separate the useful from the useless in terms of reconstruction, or to pave the way for a rational experimental reasoning.

These are the main reasons why we have chosen to limit ourselves to ethnographic material, all the while knowing that the range of tools included probably covers only a portion of the roulettes used in the African past. We do, however, benefit from a good database, formed of samples collected over more than 20 years in different parts of Africa, and ethnographic documentation accumulated over more than a century for the continent as a whole. As well as the objects in the collections of the Musée Royal de l'Afrique Centrale (Tervuren, Belgium) and of the Université de Genève (Switzerland),this database has now been enriched, in the context of the preparation of the present book, by consulting collections at the British Museum (London, UK), the Pitt Rivers Museum (Oxford, UK) and the Institut Fondamental d'Afrique Noire (Dakar, Senegal).

The main disadvantage encountered in mining ethnographic data relates to fabrication techniques. When they are not directly observed in the field – or described by the authors (which is practically never done) – it can be difficult to reconstruct the manner in which materials were manipulated or altered to obtain the finished product. Whenever possible, we have 'deconstructed' ethnographic examples to understand

haut. À cette démarche expérimentale et déductive, faut-il préférer une approche plus ethnographique, qui privilégie l'étude d'outils *effectivement* utilisés par les artisans ? Mais quelle garantie avons-nous alors que le présent ethnographique nous renseigne sur l'*ensemble* des variantes en usage dans le passé et le présent ? Faut-il alors combiner expérimentations et ethnographie, à la façon de Soper ?

Nous ne pensons pas qu'il existe une réponse idéale à ces questions. Il semble en revanche qu'un choix doive être effectué, qui se fonde prioritairement sur les objectifs de la classification. De ce point de vue, il nous semble cohérent de nous limiter ici au matériel ethnographique collecté sur le continent africain. D'une part, un large pan de la classification des roulettes s'est constitué, dès les premières tentatives de Soper, sur la base d'outils africains. C'est en vertu de leur existence effective et des détails connus de leur fabrication qu'ont été élaborées certaines subdivisions. La constitution de prototypes expérimentaux visait alors (et vise encore) à 'boucher les trous' ou à affiner les identifications. Le 'présent ethnographique' n'a donc rien de 'tyrannique' – au sens où l'entendait Wobst (1978) – mais constitue l'ossature même de la classification. D'autre part, le travail expérimental de Hurley, tellement minutieux et foisonnant qu'il entraîne des problèmes de communication, ne nous incite pas à faire de même pour les roulettes africaines. On rappellera que les 271 variantes proposées par cet auteur ne concernent que les roulettes que l'on classerait ici dans la catégorie des fibres végétales de section ronde. Faut-il en faire autant pour les 'fibres plates' et les 'outils composites' ? Gagnerait-on vraiment à proposer une classification qui inclut plusieurs centaines de variantes putatives, dont un nombre non négligeable serait sans doute l'équivalent de licornes ou de dragons dans une classification biologique ? Mais si ce n'est pas le cas, où tracer la limite entre l'expérimentation qui enrichit, et l'expérimentation qui égare ? A vrai dire, nous n'en savons rien. Et nous le savons d'autant moins que l'état actuel des identifications archéologiques ne permet pas vraiment de séparer l'utile de l'inutile en matière de reconstitution, ou de baliser la voie d'une démarche expérimentale rationnelle.

Voilà les raisons principales pour lesquelles nous avons choisi de nous en tenir au matériel ethnographique, tout en sachant que la palette d'outils pris en compte ne recouvre qu'une partie des roulettes utilisées dans le passé africain. Nous disposons cependant d'une bonne base de données, constituée de roulettes que certains collectent depuis plus de vingt ans dans différentes régions d'Afrique, et d'une documentation ethnographique accumulée depuis plus d'un siècle pour l'ensemble du continent. Outre ces objets dans les collections du Musée Royal de l'Afrique centrale (Tervuren, Belgique) et à l'Université de Genève (Suisse), la base de données a été enrichie par la consultation, lors de la préparation de ce livre, des collections du British Museum (Londres, GB), du Pitt Rivers Museum (Oxford, GB) et de l'Institut Fondamental d'Afrique Noire (Dakar, Sénégal).

Le principal inconvénient rencontré dans l'exploitation des données ethnographiques concerne les techniques de fabrication. Lorsque celles-ci ne sont pas directement observées sur le terrain – ou décrites par les auteurs (ce qui n'est pratiquement jamais fait) – il peut s'avérer difficile de reconstituer la façon dont les matériaux ont été manipulés ou altérés pour obtenir le produit fini. Chaque fois que cela a été possible, nous avons alors 'déconstruit' les exemples ethnographiques pour en comprendre le

how they were constituted. In other cases, we have been obliged, through trial and error, to experimentally reconstruct the technique used. This work, largely invisible in the classificatory scheme that follows, represents an enormous investment in time and energy, but contributes significantly – of this we are sure – to the establishment of a scheme that is more coherent and complete than its predecessors.

Popular classifications

The use of ethnographic data may give us access to information beyond the materials and manipulations of certain tools. The categorisation and denomination of 'things' and of the world at large are indeed not unique to scientists, but are shared by all humans. In ethnology, popular classifications have interested researchers since the end of the nineteenth century, not only because these give information on the nature of the relationships established with the inhabited world and on the organisation of knowledge, but also because it was long believed that there existed similarities between the principles of 'scientific' and 'popular' classification. Although the relationships are in reality more diffuse, similar processes operate in both kinds of classification, which combine 'common sense' and the empirical observation of entities (Meilleur and de Garine 2008, 364). As we initiate a new classification of rolled tools in Africa, it is edifying to consider the way in which the people who use these tools conceptualise and classify them.

An examination of the available data rapidly reveals the boundaries of such a project. First, documented contexts in which a sufficiently large range of tools are in use are rare. Artisans most often use a single roulette category, and when they use more than one these are most often from such distinct categories (e.g., cord, maize cob and/or carved cylinder) that their denomination does not give us any information at all on the prevailing classification system.

Moreover, comparative analysis of roulette names yields very disappointing results, as demonstrated by Bostoen (2004) in a study devoted to pottery vocabulary in Bantu languages. In most cases, the name of a tool derives from a verb with a meaning directly related to the decorative action: 'to mark', 'to trace', 'to engrave', 'to decorate', 'to write', 'to carve', 'to incise', 'to tattoo', 'to scarify', etc. The nomenclature is therefore based mainly on the *function* and *means of use* aspects (compare Sigaut 2000, 370–371), independently of the *structure* of the tools. There is, moreover, a limited number of cases where the term for a roulette derives from the material that was used to make it, either in generic form (rush, grass, bark, etc.) or as a specific botanical species. No reference is made in the terminology to assembly modalities or to the alteration of the materials.

This phenomenon is not limited to Bantu-speaking populations. Among the Serer in Senegal (northern branch of the Atlantic languages family), Sall (2005, 109) notes that three terms are interchangeably used to designate the folded strip roulette: *ondofodépe*, *péreg* and *ogning lire*. These terms refer respectively to the raw material (palm leaf [*Borassus flabellifer*]), the tree (palm tree), and the tool.

mode de constitution. Dans d'autres cas, il nous a fallu tâtonner expérimentalement pour reconstituer la technique utilisée. Ce travail, largement invisible dans la classification qui suit, représente un énorme investissement en temps et en énergie, mais contribue, nous en sommes sûrs, à l'établissement d'une classification plus cohérente et complète que les précédentes.

Classifications populaires

L'usage de documents ethnographiques pourrait nous donner accès à d'autres informations que celles qui concernent directement les matériaux et leurs manipulations. En effet, la catégorisation et la dénomination des 'choses' et du monde en général ne sont pas le propre des scientifiques mais de tous les humains. En ethnologie, les classifications populaires intéressent les chercheurs depuis la fin du dix-neuvième siècle, non seulement parce que celles-ci renseignent sur la nature des rapports établis avec le monde habité et sur l'organisation des savoirs, mais également parce que l'on a longtemps cru qu'il existait des similarités dans les principes de classification 'scientifiques' et 'populaires'. Si les rapports sont en réalité plus diffus, des processus similaires sont à l'œuvre dans les deux catégories de classification, qui combinent 'sens commun' et observation empirique des entités (Meilleur et de Garine 2008, 364). Au moment d'initier une nouvelle classification des outils roulés en Afrique, il n'est donc pas inintéressant de considérer la façon dont ceux qui s'en servent les conceptualisent et les classent.

L'examen des données disponibles permet rapidement de mesurer les limites d'un tel projet. Tout d'abord, rares sont les contextes documentés dans lesquels une palette d'outils suffisamment large est en usage. Les artisans se servent le plus souvent d'une unique catégorie de roulette et lorsqu'ils en utilisent plus d'une, il s'agit le plus souvent de catégories tellement distinctes que leur dénomination ne renseigne en rien sur le système de classification en vigueur (par ex : cordelette, rafle de maïs et/ou cylindre taillé).

Par ailleurs l'étude comparée du nom des roulettes fournit des résultats très décevants, comme le montre Bostoen (2004) dans une étude consacrée au vocabulaire de la poterie dans les langues bantoues. Dans la plupart des cas, le nom de l'outil dérive d'un verbe dont le sens se rapporte directement à l'action décorative : 'marquer', 'tracer', 'graver', 'décorer', 'écrire', 'sculpter', 'inciser', 'tatouer', 'scarifier', etc… La nomenclature se constitue donc majoritairement sur base des plans *fonction* et *fonctionnement* (cfr. Sigaut 2000, 370–371), indépendamment de la *structure* des outils. Il existe par ailleurs un nombre restreint d'exemples où le nom de la roulette dérive de celui du matériau utilisé pour la réaliser, soit sous une forme générique (jonc, herbe, écorce, …), soit en tant qu'espèce botanique singulière. Aucune référence n'est faite aux modalités d'assemblage ou d'altération des matériaux dans la terminologie.

Le phénomène ne se limite pas aux populations de langue bantoue. Ainsi, chez les Serer du Sénégal (branche nord de la famille des langues atlantiques), Sall (2005, 109) constate que trois noms sont indifféremment utilisés pour désigner la roulette de fibre plate pliée : *ondofodépe*, *péreg* et *ogning lire*. Ces noms renvoient respectivement à la matière brute (feuille de rônier [*Borassus flabellifer*]) , à l'arbre (rônier) et à l'outil.

The terminology is therefore rather sparse, little or not at all specialised, and apparently does not reflect the modes of fabrication of roulettes – probably because they contribute no useful information in contexts which, it should be recalled, evidence a high degree of uniformity in the choice of materials and their treatments. More information might be gleaned from popular classifications, but to do so, we would need to dispose of much more meticulous and systematic observations than have been made to date. Awaiting this, we are forced to take a strictly 'etic' approach to the phenomenon.

Scientific classification

We employed the following system. A first division was made between roulettes made from *assembled materials* (round fibres, strips, fibres+wood, etc.), those made from *modified materials* (wood, bone, inflorescences, fruits) and those consisting of *unmodified materials* (shells, recycled manufactured objects such as springs or hair curlers).

Assembled materials are divided into two sub-categories: *simple tools* (Table 1.1) and *tools on a core* (Table 1.2). The first – *simple tools* – includes a further sub-division, based on the kind of material used to make the tool: *cord* (a tuft of fine twisted fibres) or *strip*. These materials can be assembled by *twisting*, *folding*, *knotting* or *braiding*. The second sub-category – *tools on a core* – also includes a further subdivision, depending on whether the core and the wrap of the tool are made of a single element. Those that are (tools on a continuous core), are generally built up on a flexible or semi-rigid core (such as a cord or straw). Those that are not (tools on an independent core), and which can involve either a single or a multiple core, are generally made up on a rigid support (such as wood, bone or a metal rod) and using fibres or metallic wire. Nonetheless, we have chosen to retain a single category, independent of constituting materials, since known examples are linked by clear structural and historical relations, as we shall go on to discuss.

Table 1.1. Classification for simple cord and strip roulettes. Squares in grey represent tools that, to our knowledge, do not exist.

Material		***Fabrication***			
		Twisted	Knotted	Braided	Folded
Cord	String (simple twist)				
	String (double twist)				
Flat fibre (*strip*)					

Nous nous trouvons ainsi en présence d'une terminologie plutôt pauvre, peu ou pas spécialisée et qui ne paraît pas tenir compte des modalités de fabrication des roulettes – sans doute parce que ces modalités n'apportent aucune information utile dans des contextes qui, rappelons-le, connaissent une grande homogénéité dans le choix des matériaux et de leurs manipulations. Il y a sans doute plus à tirer des classifications populaires, mais il faudrait pour cela recourir à des observations beaucoup plus minutieuses et systématiques qu'elles ne l'ont été jusqu'ici. En attendant, nous en sommes réduits à développer une approche strictement 'etic' du phénomène.

Classification scientifique

Le système que nous avons adopté est le suivant. Une première division est faite entre les roulettes constituées de *matériaux assemblés* (fibres rondes, fibres plates, fibres+bois, etc.), les roulettes constituées de *matériaux modifiés* (bois, os, inflorescences, fruits) et les roulettes constituées de *matériaux non modifiés* (coquillages, objets récupérés tels que ressorts ou bigoudis).

Les *matériaux assemblés* sont subdivisés en deux sous-catégories: *outils simples* (Table 1.1) et *outils sur âme* (Table 1.2). La première de ces sous-catégories – *outils simples* – comprend une nouvelle subdivision, suivant la nature du matériau utilisé pour confectionner l'outil : *cordelette* (touffe de fines fibres tordues) ou *fibre plate*. Quant à ces matériaux, ils peuvent être assemblés par *torsadage*, *pliage*, *nouage* ou *tressage*. La seconde de ces sous-catégories – *outils sur âme* – comprend aussi une subdivision suivant que ce soit ou non la même fibre (ou cordelette) qui constitue l'âme et l'enveloppe: *outils sur âme continue* ou *outil sur âme indépendante*. Les premiers sont généralement fabriqués sur une âme souple ou semi-rigide (corde ou paille). Les seconds, qui comportent une *âme simple* ou une *âme multiple* sont généralement fabriqués sur un support rigide (bois, os ou tige de métal). Bien que la cordelette puisse être remplacée par un fil métallique, nous avons choisi de conserver une catégorie unique, indépendamment des matériaux constitutifs, car les exemples recensés entretiennent des rapports structurels et historiques évidents, comme nous le détaillons plus bas.

Table 1.1. Classification des roulettes simples en cordelettes et en fibres plates. Les cases grises représentent des outils qui, à notre connaissance, n'existent pas.

Matériau		***Fabrication***			
		Torsadée	Nouée	Tressée	Pliée
Cordelette	Cordelette (simple torsade)				
	Cordelette (double torsade)				
Fibre plate					

Table 1.2. Classification of roulettes on a core.

Roulettes on a core		Single core			Multiple core		
Cord on a continous core	Twisted						
	Knotted						
	Braided						
Cord on an independent core	Twisted						
	Knotted						
	Braided						
Strip on a continous core	Twisted						
	Knotted						
	Braided						

Simple roulettes (Table 1.1.)

Simple cord roulettes

Twisted cord roulettes

Fabrication method

Cords or twisted fibres observed ethnographically are made by rolling fibres in the palms of one's hands, on a thigh or on the ground and then knotting the ends, or one end if the roulette has been given a double or triple twist. The kind of material used, the force exerted during twisting and the fact of folding the twist back over on itself or not all contribute to significant differences. The number and thickness of the fibres also leads to variations in motifs.

Impressions

Two broad categories of twisted cords can be distinguished: *simple twisted cords* (Figure 1.2) and *double twisted cords* (Figures 1.1 and 1.3). In the case of the *simple twist*, the impressed unit, a bead of the cord, does not have any lateral limits (Figure 1.2a). The impression is continuous and diagonal. The angle of each line of elements varies with the twist, generally around 30–40° from the horizontal (Figures 1.2b and c). If the fibres used are thick, vertical lines, which are their direct impression, can be seen in the imprint (Figure 1.2b). If the fibres are thin, such as cotton for example, the impression can appear as a continuous line.

In the case of the *double twist*, the unit of impression, the bead, is limited vertically and laterally (Figure 1.3). The impression is discontinuous and appears as a series of impressions of beads, of a quadrangular shape, oriented diagonally (Figures 1.3b and c). Like simple twisted cords, the angle of this diagonal ranges from 30 to 40° depending on the twist. Again, if the fibres used are thick, lines can be seen in the impression, but these are oriented diagonally (Figure 1.3b). In all of the material we have seen, the fibres forming a cord are always oriented according to the axis of the first twist. The orientation of the fibres inside the bead thus can be used to determine the twisting axis (see Hurley 1979, 5–6 and Arazi and Manning, Section 3).

Table 1.2. Classification des roulettes sur âme.

Roulettes sur âme		Âme unique			Âmes multiples		
Cordelette sur âme continue	Torsadée						
	Nouée						
	Tressée						
Cordelette sur âme independante	Torsadée						
	Nouée						
	Tressée						
Fibre plate sur âme continue	Torsadée						
	Nouée						
	Tressée						

Roulettes simples (Table 1.1.)

Roulettes simples en cordelette

Cordelettes torsadées

Méthode de fabrication

Les cordelettes ou fibres torsadées observées aujourd'hui sont obtenues en roulant des fibres entre les paumes, sur la cuisse ou sur le sol et en nouant ensuite les extrémités, ou l'une d'elles s'il s'agit d'une double ou triple torsade. La nature du matériau utilisé, la force exercée lors de la torsion et le fait de replier ou non la torsade sur elle-même engendrent d'importantes différences. Le nombre et l'épaisseur des fibres entraînent aussi des variations de motifs.

Empreintes

On distingue deux grandes catégories de cordelettes torsadées: les *cordelettes torsadées* à *torsade simple* (Figure 1.2) et celles à *torsade double* (Figures 1.1 et 1.3). Dans le cas de la *torsade simple*, l'unité imprimée, un toron de cordelette, n'a pas de limites latérales (Figure 1.2a). L'empreinte produite est continue et diagonale, l'angle de chaque rangée d'éléments varie en fonction de la torsade, généralement aux alentours de 30 à 40 degrés par rapport à l'horizontale (Figures 1.2b et c). Si les fibres utilisées sont grossières, on distingue dans l'empreinte des traits verticaux, qui sont leur impression directe (Figure 1.2b). Si les fibres sont fines, comme du coton par exemple, l'empreinte peut apparaître comme un trait continu.

Dans le cas de la *torsade double*, l'unité imprimée, le toron, est limitée verticalement et latéralement (Figure 1.3). L'empreinte est discontinue et apparaît comme une série d'empreintes de torons, de forme quadrangulaire, orientées en diagonale (Figures 1.3b et c). Comme pour les roulettes en *torsade simple*, l'angle de cette diagonale varie entre 30 et 40 degrés selon la torsade. À nouveau, si les fibres utilisées sont grossières, on peut distinguer des traits dans l'empreinte, mais ceux-ci seront orientés en diagonale (Figure 1.3b). À en croire le matériel à notre disposition, les fibres qui composent une cordelette sont toujours orientées selon l'axe de la première torsion. L'orientation des fibres à l'intérieur du toron permet donc de déterminer l'axe de torsade (voir Hurley 1979, 5–6 et Arazi et Manning, Section 3).

Sometimes artisans knot the extremities of the tool, to produce pairs of sinuous continuous lines above and/or below the impression (Figure 1.1). A large variety of such manipulations have been recognised archaeologically (see Arazi and Manning, Section 3).

Distribution

As a roulette that is simple to make and readily available, the twisted cord roulette – considered generically, since documentation currently lacks to systematically identify variants – is also the most widespread across Africa. It is found across the entire geographic area in which rolled decorative impressions are made: Senegal (Appia-Dabit 1941; Linares de Sapir 1969; Guèye 1998), Guinea (Appia-Dabit 1941), Sierra Leone (Hardin 1996), Mali (Haselberger 1965; Gaussen *et al*. 1969; Virot 1994; Gallay *et al*. 1998; Mayor 2005), Ivory Coast (Lhote 1977; Gruner 1988), Burkina Faso (Roy 1987, 2000; Zouré 2000; Livingstone Smith, pers. obs.), Ghana (Priddy 1971, 1975; Smith 1978; Effah-Gyamfi 1980), Togo (Froelich *et al.* 1963; Rivallain 1981; Hahn 1991; Tondeur 1996; Kreamer 2000), Benin (Gosselain, pers. obs.), Niger (Etienne-Nuge and Saley 1987; Gosselain 2008a, 2008b; Haour, pers. obs.), Nigeria (Macfie 1913; Leith-Ross 1970; Wahlman 1972; Bandler and Bandler 1977; Beier 1980; Strybol 1985; Okpoko 1987; Aiyedun 1988; Fatunsin 1992; Barley 1994; Virot 1994, 2005; Nicolls 2000), Cameroon (Baumann and Vajda 1959; Lecoq 1979; Müller-Kosack 1988; Barretau and Delneuf 1990; Gosselain 1995; Gosselain *et al*. 1996; Nyst 1996; Argenti 1999), Chad (Hottot 1934; Pairault 1966; Barley 1994), Sudan (Powell-Cotton 1934; Siiriaïnen 1984; Philipson 1987), Ethiopia (Verswijver *et al.* 1996), the Democratic Republic of Congo (Coart and de Haulleville 1907; collections of the Royal Museum for Central Africa [hereafter MRAC]), Uganda (Trowell and Waschmann 1953), Rwanda (Anquetil 1984), Burundi (Chrysostome 1953) and Kenya (Hall 1939; Kratz 1989; Welbourn 1989; Wandibba 1990; Herbich and Dietler 1991).

Available data reveal the existence of large distribution zones (northern Ghana, northern Benin, western and northern Cameroon), but do not show a continuum across the entire distribution area. In West Africa, the tool seems to be more common in the northern part of the area than along its southern fringes, where carved wooden roulettes, knotted strip roulettes, or maize cob roulettes predominate. In the interlacustrine zone, the twisted cord roulette appears to be rather marginal and may not extend as far south as do knotted strip roulettes.

Often documented as the only roulette category in use, it can also be combined with other roulette types: folded strips (Okpoko 1987), knotted strips (Anquetil 1984; Barretau and Delneuf 1990), braided cords (Gallay *et al.* 1998), carved wood or bone (Hottot 1934; Bauman and Vajda 1959; Bandler and Bandler 1977; Okpoko 1987; Gosselain 1995; Gosselain *et al.* 1996), maize cobs (Smith 1978; Okpoko 1987), millet cobs (Zouré 2000), sorghum cobs (Virot 1994, 2005), *Blepharis ciliaris* (Virot 1994, 2005; Gallay *et al.* 1998; Gosselain, pers. obs.), or banana tree inflorescences (Argenti 1999; Gosselain, pers. obs.). In other words, the twisted cord roulette is used alongside the entire range of roulettes identified in Africa, with the notable exception of "'modern' manufactured objects". In

Il arrive que les artisans nouent les extrémités de l'outil pour produire des paires de sillons continus en vagues au-dessus et/ou en-dessous de l'empreinte (Figure 1.1). Une grande variété de manipulations de ce type sont reconnues archéologiquement (voir Arazi et Manning, Section 3).

Distribution

Roulette simple à réaliser, la cordelette torsadée – envisagée ici d'un point de vue générique, faute de documents permettant d'en identifier systématiquement les variantes – est également la plus répandue sur le continent africain. On la retrouve dans toute l'aire géographique du décor par impressions roulées : Sénégal (Appia-Dabit 1941 ; Linares de Sapir 1969 ; Guèye 1998), Guinée (Appia-Dabit 1941), Sierra Leone (Hardin 1996), Mali (Haselberger 1965 ; Gaussen *et al*. 1969 ; Virot 1994 ; Gallay *et al*. 1998; Mayor 2005) , Côte d'Ivoire (Lhote 1977 ; Gruner 1988), Burkina Faso (Roy 1987, 2000 ; Zouré 2000 ; Livingstone Smith, observ. pers.), Ghana (Priddy 1971, 1975 ; Smith 1978 ; Effah-Gyamfi 1980), Togo (Froelich *et al.* 1963 ; Rivallain 1981 ; Hahn 1991 ; Tondeur 1996 ; Kreamer 2000), Bénin (Gosselain, observ. pers.), Niger (Etienne-Nuge et Saley 1987 ; Gosselain 2008a, 2008b ; Haour observ. pers.), Nigeria (Macfie 1913 ; Leith-Ross 1970 ; Wahlman 1972 ; Bandler et Bandler 1977; Beier 1980 ; Strybol 1985 ; Okpoko 1987 ; Aiyedun 1988 ; Fatunsin 1992 ; Barley 1994 ; Virot 1994, 2005 ; Nicolls 2000) , Cameroun (Baumann et Vajda 1959 ; Lecoq 1979 ; Müller-Kosack 1988 ; Barretau et Delneuf 1990 ; Gosselain 1995 ; Gosselain *et al*. 1996 ; Nyst 1996 ; Argenti 1999), Tchad (Hottot 1934 ; Pairault 1966 ; Barley 1994), Soudan (Powell-Cotton 1934 ; Siiriaïnen 1984 ; Philipson 1987), Ethiopie (Verswijver *et al.* 1996), République Démocratique du Congo (Coart et de Haulleville 1907 ; collections Musée Royal d'Afrique Centrale [ci-après MRAC]), Ouganda (Trowell et Waschmann 1953), Rwanda (Anquetil 1984), Burundi (Chrysostome 1953), Kenya (Hall 1939 ; Kratz 1989 ; Welbourn 1989 ; Wandibba 1990 ; Herbich et Dietler 1991).

Les données disponibles révèlent l'existence de larges zones de distribution (Nord Ghana, Nord Bénin, Ouest et Nord Cameroun), mais n'indiquent pas de continuum à travers toute l'aire de distribution. En Afrique de l'Ouest, l'outil serait plus fréquent dans la partie septentrionale de cette aire que dans sa frange méridionale, où prédomine l'usage de roulettes en bois taillé, de roulettes en fibres plates nouées ou de rafles de maïs. Dans la zone interlacustre, la roulette de cordelette torsadée semble plutôt marginale, et pourrait s'étendre moins au sud que la roulette de fibres plates nouées.

Souvent attestée comme seule catégorie de roulette en usage, elle peut aussi être utilisée en combinaison avec d'autres roulettes : fibres plates pliées (Opoko 1987), fibres plates nouées (Anquetil 1984 ; Barretau et Delneuf 1990), cordelettes tressées (Gallay *et al.* 1998), bois ou os taillé (Hottot 1934 ; Bauman et Vajda 1959 ; Bandler et Bandler 1977 ; Okpoko 1987 ; Gosselain 1995 ; Gosselain *et al.* 1996), rafles de maïs (Smith 1978 ; Okpoko 1987), épi de mil (Zouré 2000), épi de sorgho (Virot 1994, 2005), épi de *Blepharis ciliaris* (Virot 1994, 2005 ; Gallay *et al.* 1998 ; Gosselain observ . pers.), ou inflorescence de bananier (Argenti 1999 ; Gosselain observ . pers.). En d'autres termes, la cordelette torsadée cohabite avec toute la gamme des roulettes répertoriées en Afrique, à l'exception notoire des "objets manufacturés 'modernes'". Dans les années 1980, au

the 1980s in northern Ghana, twisted cord roulettes appeared on the verge of replacing maize cob impressions (Effah-Gyamfi 1980). In southern Niger, they are, in contrast, decreasing in popularity, due to a fashion for other types of decoration, in particular polychrome painting (Gosselain 2008c; Gosselain *et al.* 2008).

Complementary data

Details on materials and methods of manipulation are lamentably absent from the published literature. 'Vegetal fibres' are often mentioned, sometimes specifying whether they come from a palm tree of raffia or Palmyra type (e.g., Gosselain *et al.* 1996; Nicolls 2000; Siiriaïnen 1984), whilst other species may have been used, such as *Hibiscus* sp. (Gosselain, pers. obs. in Niger). With these, as with the case of the palm, use of the fibres and of the plant in general is also attested in many other activities. Alternatively, the artisans use cotton or cloth twists (Gosselain, pers. obs. in Benin; Guèye 1998, 47).

Nothing indicates that these tools were made by third parties. Moreover, it is not unusual to find that an artisan makes the roulette during pottery manufacture, from the materials close at hand. When a twisted cord roulette is used to make a decoration which covers the body or the base of a vessel, it is not uncommon for artisans to add a functional justification; e.g. it is said the texture prevents the vessel from slipping from the hands during use (Priddy 1971; Smith 1978; Gosselain 1995). When another roulette is used in parallel, artisans often consider the twisted cord roulette as an implement for simply adding 'texture', not decoration (Gosselain 1995, 385–386).

In Mali, a band of rolled impressions of twisted cord roulette is often applied to mask the join between the body and the rim of a vessel made through the technique of pounding on a concave mould (Gallay *et al.* 1998; Mayor 2005).

Braided cord roulettes

Fabrication method

Braided cord motifs observable on ethnographic pottery in central Mali – the only region where this roulette type is still used – demonstrate a broad diversity, reflecting the technological variability of this tool category. Nevertheless, its *chaînes opératoires* of fabrication have never been observed among potters, and only a single roulette (Gallay *et al.* 1996, 1998)[1] allows us an ethnographic description of the simple braided cord roulette (Figures 1.4 and 1.5).

The roulette in question is made of two twisted cords of a single twist, doubled up to obtain four strands. These are braided by alternatively bringing one strand over the other, and finally knotting the end with a fine cotton thread (Figure 1.4).

However, a much greater variety of braided roulettes certainly exists. For example, the impressed motifs on ethnographic pottery, and the cords published by Bedaux *et al.* (1978, 138, numbers 2 and 3) show that the braiding of these roulettes can be done with more than four strands. The strands can also be braided two by two, leading to the term 'double braided cord', as opposed to the 'simple braided cord'. Experiments by Hurley (1979) and by S. McIntosh (see McIntosh and Guèye, Section 3, this volume) give an idea of the range of possible braids. These authors have shown that the number

nord du Ghana, elle semblait sur le point de supplanter les impressions à la rafle de maïs (Effah-Gyamfi 1980). Au sud du Niger, elle est en revanche en perte de vitesse, en raison d'un engouement pour d'autres types de décoration, au premier plan desquels figure la peinture polychrome (Gosselain 2008c; Gosselain *et al.* 2008).

Données complémentaires

Les détails sur les matériaux et les méthodes de manipulation manquent cruellement dans la littérature. On parle souvent de 'fibres végétales', en précisant parfois que celles-ci proviennent d'un palmier de type raphia ou rônier (par ex. Gosselain *et al.* 1996 ; Nicolls 2000 ; Siiriaïnen 1984). D'autres catégories de végétaux sont néanmoins envisageables, comme l'*Hibiscus sp.* (Gosselain, observ. pers. au Niger). Dans ce cas, comme pour le palmier, l'usage des fibres et de la plante en général est attesté dans de multiples autres activités. Alternativement, les artisans se servent de torsades de coton ou de bandes de tissu (Gosselain, observ. pers. au Bénin ; Guèye 1998, 47).

Rien n'indique que ces outils soient réalisés par des tierces personnes. Il n'est d'ailleurs pas rare que l'artisan confectionne son outil en cours de manufacture, à l'aide des matériaux qu'il a sous la main. Lorsque la cordelette torsadée est utilisée pour réaliser un décor couvrant de la panse ou du fond du récipient, que les artisans en apportent parfois une justification fonctionnelle : la texture ainsi conférée à la surface viserait à éviter que le récipient ne glisse des mains lorsqu'on le manipule (Priddy 1971 ; Smith 1978 ; Gosselain 1995). Lorsqu'une autre roulette est utilisée en combinaison, il arrive d'ailleurs que les artisans considèrent la cordelette torsadée comme un simple instrument de 'texturation' et non de décoration (Gosselain 1995, 385–386).

Au Mali, un rang d'impressions roulées de cordelette torsadée est souvent appliqué pour masquer le joint entre la panse et le col d'un récipient lorsque ce dernier est façonné par pilonnage sur forme concave (Gallay *et al.* 1998 ; Mayor 2005).

Cordelettes tressées

Méthode de fabrication

Les motifs imprimés de cordelettes tressées observables sur les céramiques ethnographiques du Mali central – seule région où ce type de roulette est encore employé – témoignent d'une grande diversité, qui reflète la variabilité technique de cette catégorie d'outil. Néanmoins, les chaînes opératoires de fabrication n'ont jamais été observées auprès des potières, et seule une roulette de ce genre (Gallay *et al.* 1996, 1998)[1] nous permet d'en faire une description ethnographique (Figures 1.4 et 1.5).

La roulette en question est composée de deux cordelettes de fibres torsadées, à simple torsade, repliées sur elles-mêmes pour obtenir quatre brins. Ceux-ci sont tressés en ramenant alternativement un brin sur l'autre, puis noués à l'extrémité de l'outil à l'aide d'un fin fil de coton (Figure 1.4).

Il existe sans aucun doute une bien plus grande variété de roulettes de cordelette tressée. Par exemple, les motifs imprimés sur les panses des céramiques ethnographiques, ainsi que les cordelettes illustrées par Bedaux *et al.* (1978, 138, numéros 2 et 3) montrent que le tressage de ces roulettes peut faire appel à un nombre de brins supérieur à quatre. Les brins peuvent également être tressés deux par deux, conduisant à l'appellation de cordelette tressée double, par opposition à la cordelette tressée simple. Les expérimentations de Hurley (1979) et de S. McIntosh (voir S. McIntosh et Guèye, Section 3, ce volume) donnent une idée de la variété des tressages possibles. Ces auteurs

and thickness of the cords, as well as differences in the braiding technique itself, create variations in motifs (see e.g. Hurley 1979, 84–86). The direction and pressure exerted during application on the soft paste of the vessel also increases variability (S. McIntosh 1995, 135; S. McIntosh and Guèye, Section 3, this volume).

Impressions

Considering the sole example we have available, the impressed element is composed of sections of a cord (several beads). The imprint is discontinuous and appears as a series of impressions of cord segments arranged in chevrons (Figures 1.5b and c).

Distribution

To the best of our knowledge, braided cord roulettes are currently in use only in the Inland Niger Delta of Mali. Specifically, they are typical of the production of Somono potters in the south, who occupy the zone between the Bani and the Niger, and between Mopti and the area south of Jenné. These roulettes are also used by some northern Somono potters living north of Lake Débo, a zone where these tools have otherwise almost entirely disappeared. Finally, these roulettes have also been borrowed by some Bambara potters of the San region after intermarriage. Their use, however, which is fairly rare today, is rapidly being abandoned (Gallay *et al.* 1998; Mayor 2005; *in press*).

Three-strand braided roulettes made out of the bark of the tree *Grewia mollis,* reported by Pairault (1966, 124) in southern Chad, cannot be assigned to this tool category, given that the impressed motifs feature parallel grooves, as can be seen in photographs of the pottery (Pairault 1996, figs. 86 and 91).

Complementary data

In Central Mali, braided cord roulettes are associated with direct impressions using wooden styli – which are equally specific to the southern somono tradition – , to rolled twisted cord impressions, and to comb incisions.

Knotted cord roulettes

Soper (1985, fig. 4) illustrates this tool experimentally and mentions it only briefly (1985, 35), but it remains unknown ethnographically. It should be noted that the impression of such a tool may be easily confused with that of a twisted or braided cord roulette, and it is thus possible that it may be hitherto unrecognised in archaeological contexts.

Simple strip roulettes

Folded strip roulettes

Fabrication method

Folded strip roulettes are made using two flat strips, or a single strip folded over itself, and each strand is alternately twisted and folded over the other. The twisting movement, already noted by some authors (Gronenborn and Magnavita 2000, 57; Wiessmüller 2001),[2] explains the asymmetry of the impressed elements, which is typical of this tool category. As a result of the section being triangular, a repetition of the cycle is visible in every third impressed element (see Section 2).

ont montré que le nombre et l'épaisseur des cordelettes ainsi que les différences dans le mode de tressage entraînent des variations de motifs (voir par exemple Hurley 1979, 84–86). La direction et la pression exercée sur la pâte molle engendrent également des différences (S. McIntosh 1995, 135 ; S. McIntosh et Guèye, Section 3, ce volume).

Empreintes

L'observation su seul exemple dont on dispose, montre que l'élément imprimé est constitué de sections de cordes (plusieurs torons). L'empreinte est discontinue et apparaît comme une série d'empreintes de segments de corde en chevrons (Figures 1.5b et c).

Distribution

À notre connaissance, les roulettes de cordelettes tressées sont uniquement utilisées dans le Delta intérieur du Niger (Mali) à l'heure actuelle. Elles sont caractéristiques de la production des potières somono du sud, établies dans la zone située entre Bani et Niger et entre le sud de Djenné et Mopti. Ces roulettes sont aussi utilisées par quelques potières somono du Nord habitant au nord du lac Débo, une zone où de tels outils ont sinon presque totalement disparu. Enfin, elles ont aussi été empruntées par quelques potières bambara de la région de San suite à des intermariages. Leur usage, peu fréquent aujourd'hui, est en voie d'abandon (Gallay *et al.* 1998 ; Mayor 2005 ; *sous presse*).

Les tresses à trois brins d'écorce de *Grewia mollis* mentionnées par Pairault (1966, 124) dans le sud du Tchad ne semblent pas appartenir cette catégorie d'outils, au vu des motifs imprimés de sillons parallèles visibles sur les photographies de céramiques (Pairault 1966, figs. 86 et 91).

Données complémentaires

Au Mali central, la roulette de cordelette tressée est associée à des impressions directes de poinçons de bois – également spécifiques de la tradition somono du sud –, à des impressions roulées de cordelette torsadée, ainsi qu'à des incisions au peigne.

Cordelettes nouées

Soper (1985, Fig. 4) illustre cette roulette de manière expérimentale, et la mentionne très brièvement (1985, 35), mais elle reste à ce jour inconnue ethnographiquement. Il convient de noter que l'empreinte d'un tel outil se confondrait facilement avec celles de roulettes de cordelette torsadée ou tressée, et qu'il est donc possible qu'il figure sans y être reconnu dans des contextes archéologiques.

Roulettes simples en fibres plates

Fibres plates pliées

Méthode de fabrication

Les roulettes en fibre plate pliée sont réalisées à l'aide de deux fibres plates, ou d'une seule fibre repliée sur elle-même, dont chaque brin est alternativement tordu et replié sur l'autre. Le mouvement de torsion, déjà souligné par certains auteurs (Gronenborn et Magnavita 2000, 57 ; Wiessmüller 2001)[2] explique l'asymétrie des éléments imprimés, typique de cette catégorie d'outil. Sa section étant triangulaire, on note une répétition du cycle tous les trois éléments (Voir Section 2).

Impressions

Depending on the size of the strips used and the degree of tightness in each fold, these tools can produce very different tools and impressions (compare Figures 1.6 and 1.7 for the tools). In Figure 1.6, seen in Cameroon, the impressed unit is limited laterally and vertically; it involves a segment of a strip. This is of more or less quadrangular form, but is asymmetrical, making it appear as though the part of the fibre imprinted is deformed, like a horizontal Z. If the folding is loose (Figures 1.8a and 1.9a), the height of each impressed element is greater than if the folding and the twisting are tight (in which case the element produced is considerably shorter; see below and Figure 1.10a). The impression produced is discontinuous and in a checkerboard pattern.

The second kind of folded roulette, typical of roulettes made in Senegal, is similar, but the tool is tighter and has a spiral pattern (Figure 1.7). The impressed segments are markedly wider than they are high, and they are clearly asymmetrical (Figure 1.10b and c) – again like a horizontal Z. The asymmetry, as before, appears to be linked to the twisting and folding of the strips. The impression produced is discontinuous and is oriented diagonally (Figure 1.10c).

Distribution

Despite the fact that this roulette is easy to make, it is not as widely distributed as, for example, the twisted cord roulettes. Rather, data available in the literature and in museum collections highlight the rather restricted and scattered geographical distribution of folded strip roulette usage: western Senegal (Sall 2005), the north-east quarter of Nigeria (Pitt Rivers collections [1930.43.44]; Leith-Ross 1970; Platte 1990), the northern half of Cameroon (Gosselain *et al.* 1996; Langlois 2004), south-east Chad (Langlois *et al.* 1998) and the extreme south of Sudan (Langlois 2004). The archaeological data, however, suggest that this roulette was formerly more widespread (see Haour and Keita, Section 3). The cultural history of this technique, present from Senegal to Sudan, therefore remains to be determined.

Complementary data

These roulettes are made using strips of palm leaves from *Borassus aethiopum* or *Hyphaene thebaica* (Gronenborn and Magnavita 2000, 59; Langlois 2004, 114). Langlois *et al.* (1998) also indicate that the Kabalay potters of Chad apply the roulettes by single impression rather than rolling.

Knotted strip roulettes

Fabrication method

Described in part by Soper (1985, 35–39), this kind of roulette is made using one, two, three or four strips, knotted and tightened to varying degrees. Three variants have so far been identified:

1) When a single fibre is used, the tool "*est obtenu en nouant sur elle même une fibre plate, chaque boucle servent de support à la suivante*" (Langlois 2004, 116) (Figure 1.11). This is Soper's (1985) famous knotted strip roulette (KPR).
2) When two or four fibres are used (Figure 1.12), it is the loop of each strip that serves as a support for the following one (termed 'Type 2' by De Meulemeester [1975, 210], 'accordion pleat roulette' by Soper [1985, 39], and '*roulette nouée*' by Desmedt [1991, 163]).

Empreintes

Selon la taille des fibres et le degré de serrage de chaque pli, on obtient des outils et des empreintes fort différentes (comparer Figures 1.6 et 1.7 pour les outils). Dans le cas de l'outil représenté en Figure 1.6, observé au Cameroun, l'unité imprimée est limitée latéralement et verticalement. Il s'agit d'un segment de fibre plate, de forme plus ou moins quadrangulaire, mais asymétrique, laissant à penser que la partie de fibre imprimée est déformée – comme un Z couché. Si le pliage est lâche (Figures 1.8a et 1.9a), la hauteur de chaque élément imprimé est plus grande que si le pliage et la torsion sont serrés (l'élément est alors nettement moins haut ; voir Figure 1.10a et ci-dessous). L'empreinte produite est discontinue et donne l'impression d'un damier.

Le second type de roulette pliée, typique des outils en usage au Sénégal, est similaire au précédent, mais l'outil est plus serré et spiralé (Figure 1.7). Les éléments imprimés sont nettement plus larges que hauts, et ils sont clairement asymétriques (Figure 1.10b et c) – à nouveau comme un Z couché. L'asymétrie, comme dans le cas précédent, semble liée à la torsion et au pliage des fibres plates. L'empreinte produite est discontinue et orientée en diagonale (Figure 1.10c).

Distribution

La facilité de fabrication de cette roulette n'engendre pas une distribution massive, comme c'est le cas de la cordelette torsadée. Au contraire, les données disponibles dans la littérature et les collections de musées soulignent le caractère plutôt discret et géographiquement éclaté de l'usage des fibres plates pliées : ouest du Sénégal (Sall 2005), quart nord-est du Nigeria (collections Pitt Rivers [1930.43.44] ; Leith-Ross 1970 ; Platte 1990), moitié nord du Cameroun (Gosselain *et al.* 1996 ; Langlois 2004), sud-est du Tchad (Langlois *et al.* 1998) et extrême sud du Soudan (Langlois 2004). Les données archéologiques indiquent cependant que cette roulette était autrefois plus répandu (voir Haour et Keita, Section 3). Il reste donc à comprendre l'histoire culturelle de cette technique présente du Sénégal au Soudan.

Données complémentaires

Ces roulettes sont réalisées à l'aide de lanières de feuilles de palmiers des espèces *Borassus aethiopum* ou *Hyphaene thebaica* (Gronenborn et Magnavita 2000, 59 ; Langlois 2004, 114). Langlois *et al.* (1998) signalent par ailleurs que les potières Kabalay du Tchad appliquent les roulettes par impressions simples plus qu'elles ne les roulent.

Fibres plates nouées

Méthode de fabrication

Partiellement décrit par Soper (1985, 35–39), ce type de roulette est fabriqué à aide d'une, deux, trois ou quatre fibres plates que l'on noue et que l'on serre plus ou moins fort. À ce stade on relève trois variantes:

1) Lorsqu'on utilise une seule fibre, l'outil "est obtenu en nouant sur elle-même une fibre plate, chaque boucle servant de support à la suivante" (Langlois 2004, 116) (Figure 1.11). Il s'agit de la 'knotted strip roulette' [KPR] illustrée par Soper (1985).
2) Lorsqu'on utilise deux ou quatre fibres (Figure 1.12), c'est la boucle de chaque fibre qui sert de support à la fibre suivante (qualifié de 'Type 2' par De Meulemeester [1975, 210], '*accordion pleat roulette*' par Soper [1985, 39], ou 'roulette nouée' par Desmedt [1991, 163]).

3) Finally, we can describe a rare object that we have decided to attribute to this category (Figure 1.13). This roulette is made by gathering two or four blades of *graminae* that are attached together at one end. These strands are then interlaced to produce a knotted roulette. Only a few examples of this tool are known, all at the British Museum ([1946.AF18.176], [1946.AF18.19], [1946.AF18.181]).

It is entirely conceivable that a wider variety of knotted strip roulettes existed in the past than are known today.

Impressions

As far as the one-strand knotted strip roulette is concerned, the impressed element, which is limited laterally and vertically, is quadrangular and symmetrical in shape. It consists in fact of the impression of a segment of flat fibre. This impression is square if the knotting was loose and rectangular if the knotting was tight. The impression produced is discontinuous, and takes the form of a series of impressions on a diagonal (Figures 1.14 to 1.16).

As far as the one-strand knotted strip roulette is concerned, the impressed element is limited laterally and vertically; it is a segment of a strip. It is more or less quadrangular and symmetrical in shape, resulting in a square or rectangular shape, which is higher when the knot is loose and wider than it is high when the knot is tight. The impression produced is discontinuous and takes the form of a series of impressions in a diagonal. In reality, the impressed elements are aligned along the vertical axis, and staggered along the horizontal axis. The diagnostic configuration is composed of four impressed elements (Figures 1.14b and c) and the cycle of repetition occurs in every fifth element.

We note a near-systematic anomaly in the impression, resembling a series of 'double grains of rice' or a figure of eight (very clear on Figure 2.3). This situation is due to the geometry of the roulette: staggering often occurs between the loops in the vertical axis (see the profile of the roulette represented in Figure 1.11). This staggering causes one loop out of every two to be less deeply impressed than the others, giving the appearance of 'double grains of rice' (see e.g., Soper 1985, 38, Fig. 5; Haour, Section 3, this volume).

Finally, by inverting the knotting at some point during fabrication, an alternating knotted strip roulette is created (Figure 1.11). This inversion is obtained by reserving part of the fibre at the beginning of the manipulation.[3]

With respect to the knotted strip roulette with four strands (the 'accordion pleat' strip roulette of Soper 1985, 39), the impressed unit is limited horizontally and vertically. It involves a quadrangular segment of flat fibre that is much wider than it is high when the fibres are tight (which is the case for the roulette collected in Cameroon shown in Figure 1.12, as well as the one published in Soper [1985, 39, Fig. 6]). It should be noted that the fibres are tightened so much that they become likely to fray. It is thus the edge of the fibre, and not its surface, that is impressed in places (see Figure 1.15b, second column of impressions starting from the left). The impression is discontinuous and appears as a series of impressions in vertical columns. The diagnostic configuration is composed of four elements (Figure 1.15b and c) and the cycle of repetition occurs in every fourth element. No variants are known.

Finally, regarding the knotted strip roulettes kept at the British Museum, the

3) Il convient enfin de noter un objet exceptionnel que nous avons décidé d'attribuer à cette catégorie (Figure 1.13). Cette roulette est fabriquée en rassemblant deux ou quatre tiges plates de graminée que l'on attache ensemble à une extrémité. On entrelace ensuite ces brins de manière à obtenir une roulette nouée. On ne connaît que quelques exemples de cet outil, tous conservés au British Museum ([1946.AF18.176], [1946.AF18.19], [1946.AF18.181]).

Il est tout à fait concevable qu'il ait existé dans le passé une plus grande variété de roulettes de fibres plates nouées.

Empreintes

En ce qui concerne la fibre plate nouée à un brin, l'élément imprimé, limité latéralement et verticalement, est de forme quadrangulaire et symétrique. Il s'agit en fait de l'empreinte d'un segment de fibre plate. Elle est carrée, si le noeud est lâche, et rectangulaire s'il est serré. L'empreinte produite est discontinue et prend l'apparence d'une série d'impressions (Figures 1.14 à 1.16).

En ce qui concerne la fibre plate nouée à un brin, l'élément imprimé est limité latéralement et verticalement ; il s'agit d'un segment de fibre plate. Elle est de forme plus ou moins quadrangulaire et symétrique, donnant lieu à un carré ou un rectangle, qui est plus haut dans le cas d'un noeud lâche, et plus large que haut s'il est serré. L'empreinte produite est discontinue et prend l'apparence d'une série d'impressions en diagonale. En réalité, les éléments imprimés sont alignés sur l'axe vertical et décalés sur l'axe horizontal. La configuration symptomatique est composée de quatre éléments imprimés (Figure 1.14b et c) et le cycle se répète tous les cinq éléments.

On note quasi-systématiquement une anomalie d'impression donnant le sentiment de séries de 'doubles grains de riz' ou de 'huit' (très visible sur la Figure 2.3). Cette situation tient à la géométrie de l'objet. En effet, on note souvent un décalage entre les boucles dans l'axe vertical (voir le profil de la roulette représentée en Figure 1.11). Ce décalage fait qu'une boucle sur deux est moins imprimée que les autres, d'où cette apparence d'impressions en 'doubles grains de riz' (voir par exemple Soper 1985, 38, Fig. 5 ; Haour, Section 3, ce volume).

Enfin, en inversant le nouage en cours de fabrication, on obtient une roulette en fibres plates nouée alterne (Figures 1.11). Cette inversion du nouage est obtenue en réservant une partie de la fibre au début de la manipulation.[3]

En ce qui concerne la fibre plate nouée à quatre brins ('*accordion pleat*' *strip roulette* de Soper 1985, 39), l'unité imprimée est limitée horizontalement et verticalement. Il s'agit d'un segment quadrangulaire de fibre plate, qui est beaucoup plus large que haut lorsque les fibres sont bien serrées (ce qui est le cas de la roulette collectée au Cameroun illustrée en Figure 1.12, et de celle figurée par Soper [1985, 39, Fig. 6]). On notera que les fibres sont tellement serrées qu'elles sont susceptibles de s'effilocher. C'est alors la tranche de la fibre, et non sa surface, qui s'imprime par endroits (voir Figure 1.15b ; seconde colonne d'impressions en partant de la gauche). L'empreinte produite est discontinue et apparaît comme une série d'impressions en colonnes verticales. La configuration symptomatique est composée de quatre éléments imprimés (Figure 1.15b et c) et le cycle se répète tous les quatre éléments. Il n'existe aucune variante connue.

Finalement, en ce qui concerne les roulettes en fibre plate nouée conservées au

impressed unit is clearly limited horizontally and vertically. It involves a quadrangular segment of strip that is higher than it is wide (Figure 1.16). The impression produced is discontinuous and appears as a checkerboard pattern. The diagnostic configuration is composed of four impressed elements (Figure 1.16b and c) and the cycle of repetition occurs in every fourth element.

Distribution

Knotted strip roulettes have an extremely broad distribution in sub-Saharan Africa, although not quite as widespread as that of twisted cord roulettes. The area of usage of knotted strip roulettes shifts eastwards and southwards compared to that of twisted cord roulettes: south-east Nigeria (Nwafor 1980; Okpoko 1987), Cameroon (Bedaux and Lange 1983; David *et al.* 1988; Barreteau and Delneuf 1990; Barley 1994; Gosselain 1995; Gosselain *et al.* 1996), the eastern part of the Central African Republic (Moga 1987), the north-eastern part of the Democratic Republic of Congo (ethnographic collections at the MRAC; McMaster 1988; Mercader *et al.* 2000), the extreme south of Sudan (Crowfoot 1925; Powell-Cotton 1934; Phillipson 1987), Uganda (Trowell 1941; Trowell and Wachsmann 1953; Roscoe 1965; Barley 1994), Rwanda (Anquetil 1985), Burundi (Célis and Nzikobanyanka 1984; Senasson 1993), eastern Kenya (Herbich 1987; Barbour 1989; Kratz 1989; Wandibba 1990; Herbich and Dietler 1991) and northern Tanzania (Reche 1914; Césard 1936; Liesegang 1975; Barley 1994). The distribution may be continuous within this zone, but this remains unconfirmed due to a lack of data concerning the Central African Republic. The eastern and southern limits of the zone nonetheless correspond to those of roulettes in general. To the north and west, the limits are more blurred. While the presence of knotted strip roulettes is mainly attested south of the seventh parallel, it is also quite widespread in northern Cameroon (up to the twelfth parallel), with a complete absence on either side of this zone (in Nigeria and Chad).

The use of the knotted strip roulette variant with four sides has so far been observed only in southern Cameroon, among the Beti (Tessmann 1913) and Gbaya potters (Gosselain 1995).

Comparing the distribution of knotted strip roulette usage with linguistic groups suggests the tool spread gradually, independently of population history. Its presence is particularly common on the northern edges of the Bantu area (Bantoid, groups A and J; very marginally groups C and D), in the Adamawa-Oubangian language area in contact with (and sometimes permeating) Bantu groups A, C, D and J, and south-east of the area of Nilotic languages, in contact with Bantu group J. A proposed correlation between linguistic affiliation – in particular Nilotic (Soper 1985; Desmedt 1991) – and use of knotted strip roulettes is thus quite improbable, as was already pointed out by Herbich and Dietler (1991, 122).

Often used alone to make rolled impressions, knotted strip roulettes may also be associated with twisted cord roulettes (Trowell and Wachsmann 1953; Nwafor 1980; Anquetil 1985; Okpoko 1987; Kratz 1989; Barreteau and Delneuf 1990; Wandibba 1990; Herbich and Dietler 1991), carved wooden roulettes (Trowell and Wachsmann 1953; Gosselain 1995; Mercader *et al*. 2000) and maize cobs (Nwafor 1980; Okpoko 1987; Herbich and Dietler 1991). Among the Luo of Kenya, Herbich and Dietler (1991; see

British Museum, l'unité imprimée est bien limitée horizontalement et verticalement. Il s'agit d'un morceau de fibre plate quadrangulaire plus haut que large (Figure 1.16). L'empreinte produite est discontinue et apparaît comme une série d'impressions en damier. La configuration symptomatique est composée de quatre éléments imprimés (Figure 1.16b et c) et le cycle se répète tous les quatre éléments.

Distribution

La roulette de fibre plate nouée connaît une distribution extrêmement large en Afrique sub-saharienne, sans atteindre toutefois celle des cordelettes torsadées. L'aire d'utilisation de cet outil se décale en effet vers l'est et vers le sud par rapport à celle de la cordelette torsadée : sud-est du Nigeria (Nwafor 1980 ; Okpoko 1987), Cameroun (Bedaux et Lange 1983 ; David *et al.* 1988 ; Barreteau et Delneuf 1990 ; Barley 1994 ; Gosselain 1995 ; Gosselain *et al.* 1996), est de la Centrafrique (Moga 1987), nord-est de la R. D. Congo (collections ethnographiques du MRAC ; McMaster 1988 ; Mercader *et al.* 2000), extrême sud du Soudan (Crowfoot 1925 ; Powell-Cotton 1934 ; Phillipson 1987), Ouganda (Trowell 1941 ; Trowell et Wachsmann 1953 ; Roscoe 1965 ; Barley 1994), Rwanda (Anquetil 1985), Burundi (Célis et Nzikobanyanka 1984 ; Senasson 1993), est du Kenya (Herbich 1987 ; Barbour 1989 ; Kratz 1989 ; Wandibba 1990 ; Herbich et Dietler 1991), nord de la Tanzanie (Reche 1914 ; Césard 1936 ; Liesegang 1975 ; Barley 1994). La distribution pourrait être continue au sein de cette zone, mais la faiblesse des données relatives à la Centrafrique ne permet pas de le confirmer. Les limites orientales et méridionales de la zone correspondent en tout cas à celle des outils roulés en général. Vers le nord et vers l'ouest, les frontières sont plus floues. Si la présence de cette catégorie de roulette est majoritairement attestée au sud du septième parallèle, elle est également très répandue au nord du Cameroun (jusqu'au douzième parallèle), sans aucun écho de part et d'autre de cette zone (Nigeria et Tchad).

L'usage d'une variante à quatre faces de la roulette en fibre plate nouée n'est signalé à ce jour qu'au sud du Cameroun, chez des potières Beti (Tessmann 1913) et Gbaya (Gosselain 1995).

La comparaison entre l'aire de distribution des fibres plates nouées et celle des langues montre que l'outil a vraisemblablement connu une diffusion de proche en proche, indépendante de l'histoire des populations. Sa présence est en effet particulièrement fréquente aux marges septentrionales de l'aire bantoue (Bantoïde, groupes A et J ; très marginalement groupes C et D), au sein de l'aire des langues adamawa-oubangiennes, en contact (et s'interpénétrant parfois) avec les groupes bantous A, C, D et J, et au sud-est de l'aire des langues nilotiques, en contact avec le groupe bantou J. La corrélation entre groupe linguistique – notamment nilotiques (Soper 1985 ; Desmedt 1991) – et usage de ce type de roulette s'avère donc très peu probable, comme l'avaient déjà souligné Herbich et Dietler (1991, 122).

Souvent utilisées seules pour réaliser les impressions roulées, les fibres plates nouées peuvent aussi être associées à des cordelettes torsadées (Trowell et Wachsmann 1953 ; Nwafor 1980 ; Anquetil 1985 ; Okpoko 1987 ; Kratz 1989 ; Barreteau et Delneuf 1990 ; Wandibba 1990 ; Herbich et Dietler 1991), des roulettes en bois taillé (Trowell et Wachsmann 1953 ; Gosselain 1995 ; Mercader *et al*. 2000) et des rafles de maïs (Nwafor 1980 ; Okpoko 1987 ; Herbich et Dietler 1991). Chez les Luo du Kenya, Herbich et Dietler

also Herbich 1987) have observed how different roulettes can be deliberately used on the same vessels or types of vessels by certain communities or among certain potters in order to create or perpetuate ornamental micro-styles reflecting lines of kinship or friendship.

Another technique frequently associated with knotted strip roulette impressions is the rocked impression of a notched bracelet. This is especially found among Adamawa-Oubanguian-speaking populations. In one of them – the Gbaya – the knotted strip roulette is sometimes abandoned in favour of the bracelet, impressions of which are considered more beautiful and more modern (Gosselain, pers. obs. in 2005).

Complementary data

This roulette type is often made using a section of fresh raffia (*Raphia farinifera*) or Palmyra (*Borassus sp.*) palm leaf. We also note the use of reed strips (Herbich and Dietler 1991), and of synthetic fibres and 'nylon' (Herbich and Dietler 1991; Senasson 1993; Livingstone Smith, pers. obs.). As far as we know, the potters make the tools themselves.

Roulettes on a core (Table 1.2)

Here we consider two broad categories: *roulettes on a continuous core*, and *roulettes on an independent core*.

Roulettes on a continuous core

Two types of *roulettes on a continuous core* are known: those made using a *cord*, and those made using a *flat fibre* (strip).

Cord wrapped on a continuous core

Fabrication method and impressions

These roulettes are made of a twisted cord folded back (Figure 1.17), where one portion of the cord is wrapped around the other, which serves as the flexible core. Numerous variants exist, depending on the sort of cord used and the manner in which it is wrapped. For example, one can obtain an impression where each cycle of rotation is marked by the imprint of a group of beads, in a diagonal formation (Figure 1.17).

Distribution

The only ethnographic examples known thus far are a roulette collected by A. Livingstone Smith in Burkina Faso, the roulettes collected by W. E. Nicholson in Sokoto (northern Nigeria) and now in the Pitt Rivers Museum ([1927.61.7.1] and [1927.61.7.2]), and an item, also from northern Nigeria, in the British Museum ([Af1927.12–8.11]; Figure 1.18). The examples collected by Nicholson (1929, 1931) were used by Adarawa and Zorumawa potters, to whom he attributed Fulani origin, but who in fact belong to the large Hausa group. It is also among the male artisans of this region straddling Nigeria

(1991 ; voir aussi Herbich 1987) observent que l'usage de roulettes différentes, sur les mêmes récipients ou les mêmes classes de récipients, peut être délibéré dans certaines communautés ou chez certaines potières. Il s'agit alors de créer ou de perpétuer des micro-styles ornementaux reflétant des liens de parenté ou d'amitié.

Une autre technique fréquemment associée à l'impression de la fibre plate nouée est l'impression basculante au bracelet encoché. On la retrouve surtout parmi les populations de langue adamawa-oubanguienne. Dans l'une d'entre elles – les Gbaya – la roulette de fibre plate nouée est parfois abandonnée au profit du bracelet, dont les impressions sont jugées plus belles et plus modernes (Gosselain, observ. pers. en 2005).

Données complémentaires

Ce type de roulette est fréquemment réalisé à l'aide d'une section de feuille fraîche de palmier raphia (*Raphia farinifera*) ou de palmier rônier (*Borassus sp.*). On signale également l'usage de lamelles de roseau (Herbich et Dietler 1991) et de fibres synthétiques et de 'nylon' (Herbich et Dietler 1991 ; Senasson 1993; Livingstone Smith observ. pers.). Pour autant qu'on le sache, ce sont les artisans eux-mêmes qui les confectionnent.

Roulettes sur âme (Table 1.2.)

Nous considérons ici deux grandes catégories: les roulettes sur *âme continue* et les roulettes sur *âme indépendante*.

Roulettes sur âme continue

Deux types de roulettes sur *âme continue* sont connus : celles qui sont fabriquées à l'aide d'une *cordelette* et celles qui le sont à l'aide de *fibres plates*.

Cordelettes enroulées sur âme continue

Méthode de fabrication et empreintes

Ces roulettes sont constituées d'une cordelette torsadée repliée (Figure 1.17), dont la seconde partie est enroulée autour de la première partie, servant d'âme souple. Il existe de nombreuses variantes en fonction du type de cordelette et de la manière de l'enrouler. On peut obtenir, par exemple, une impression où chaque cycle de rotation est marqué par l'empreinte d'un groupe de torons en diagonale (Figure 1.17).

Distribution

Les seuls exemplaires ethnographiques attestés à ce jour sont une roulette collectée par A. Livingstone Smith au Burkina Faso, les roulettes collectées par W. E. Nicholson à Sokoto (nord du Nigeria), conservées au Pitt Rivers Museum [1927.61.7.1] et [1927.61.7.2]), et un spécimen, provenant également du nord du Nigeria, conservé au British Museum ([Af1927.12–8.11] (Figure 1.18). Les exemplaires récoltés par Nicholson étaient utilisées par des potiers Adarawa et Zorumawa, auxquels Nicholson (1929, 1931) attribue une origine peule, mais qui appartiennent au vaste ensemble Hausa. C'est également chez

and Niger that we find the very widespread use of roulettes involving cord or copper wire wrapped on either a wooden or iron core (Gosselain, pers. obs.; see below); this could thus be indicative of a marginal, or older, variant of a tool category associated with a single historical tradition. It should however be kept in mind that cord-wrapped roulettes on a continuous core may have been described in the literature as 'twisted cord roulette' or 'knotted cord roulette' (as in fact does Nicholson 1929, 47, when he describes a "piece of string doubled, twisted and knotted"), such that it is difficult to draw firm conclusions regarding the frequency and true distribution of this tool.

Braided cords on a continuous core

Fabrication method and impressions

This roulette (Figure 1.19) is very probably, judging by the photograph,[4] made of four single-twist cotton cords, doubled over. The first part of the cord serves as the core, around which the free strands are interlaced before being knotted at the end of the tool. As far as the impressions are concerned, it is notable that there exists a considerable gap between the segments which make up each chevron (Figures 1.19 and 1.20c). This distance is related to the fact that the acting part of the cord is supported by a core (see also McIntosh and Guèye, Section 3, this volume).

Distribution

The distribution of this roulette is exactly the same as that of the simple braided cord roulette (see above, page 60).

Braided strips on a continuous core

Fabrication method and impressions

Roulettes belonging to the second category of roulettes on a *continuous core* are made using at least five strands of flexible straw (*graminae* stems or reeds), folded over themselves, which gives them a flat structure:[5] the first part of the strands (the thinnest part of the straw) forms the core, around which the lower part of the strands (the thickest and most solid) is braided. Each strand is folded in turn over its neighbour in a polygonal structure, which grows in a spiral because of the odd number of strands, and ultimately creating a roulette of sub-circular cross-section. When braiding is complete, one strand of the core is used to knot all the strands together (Figure 1.21). Impressions are characterised by parallel rows of impressions arranged in the manner of the steps of a staircase (Figure 1.23).

At least two variants of this type of roulette exist. The first (Figure 1.24) is characterised by an inversion of the braiding at a certain height, creating a chevron pattern, and is termed an alternately-braided strip roulette on a continuous core. The second variant shows cross-braiding at each step and is termed a cross-braided strip roulette on a continuous core (Figure 1.25). It is possible that other types of braiding exist, involving different numbers of strands, but we know of no such ethnographic examples. It should be noted that it is very difficult to determine the number of strands used, or the technical gestures, solely on the basis of the finished tool.[6]

les artisans masculins de cette région, à cheval sur le Nigeria et le Niger, que l'on retrouve l'usage très répandu de roulettes en cordelette ou fil de cuivre sur âme en bois ou en fer (Gosselain, observ. pers. ; voir plus bas) ; il pourrait donc s'agir d'une variante marginale, ou plus ancienne, d'une catégorie d'outil associée à une même tradition historique. On gardera toutefois à l'esprit que les roulettes en corde sur âme continue pourraient avoir été décrites comme 'cordelette torsadée' ou 'cordelette nouée' dans la littérature (ce que fait d'ailleurs Nicholson 1929, 47 qui évoque une "piece of string doubled, twisted and knotted"), de sorte qu'il reste difficile de se prononcer sur la fréquence et la distribution réelles de cet outil.

Cordelettes tressées sur âme continue

Méthode de fabrication et empreintes

Cette roulette (Figure 1.19) est très probablement, d'après la photographie,[4] composée de quatre cordelettes de coton à simple torsade, repliées en leur milieu. La première partie de la corde sert d'âme, autour de laquelle sont entrecroisés les brins libres, avant d'être noués à l'extrémité de l'outil. En ce qui concerne l'empreinte, on note un écart important entre les segments qui composent les chevrons (Figures 1.19 et 1.20c). L'écart en question est lié au fait que la partie agissante de la cordelette est soutenue par une âme (voir aussi McIntosh et Guèye, Section 3, ce volume).

Distribution

La distribution de cette roulette est exactement la même que pour la roulette simple de cordelette tressée (voir ci-dessus, page 61).

Fibres plates tressées sur âme continue

Méthode de fabrication et empreintes

Les roulettes appartenant à cette catégorie de roulette sur *âme continue* sont fabriquées à l'aide d'au moins cinq brins de paille souple (tiges de graminées ou de roseaux), repliés sur eux-mêmes, ce qui leur confère une structure plate :[5] la première partie des brins (qui correspond à la section la plus fine des pailles) constitue l'âme autour de laquelle la partie inférieure des brins (plus épaisse et solide) est tressée. Chaque brin est tour à tour replié sur le brin voisin dans une structure polygonale, croissant en spirale grâce au nombre impair de brins, et conduisant à la formation d'une roulette de section sub-circulaire. À la fin du tressage, l'un des brins de l'âme centrale est utilisé pour nouer ensemble tous les brins (Figure 1.21). Les impressions se caractérisent par des rangées parallèles d'unités en escalier (Figure 1.23).

Il existe au moins deux variantes de roulette de ce type. La première (Figure 1.24) se caractérise par une inversion du tressage à une certaine hauteur, créant un motif en chevron; on la dénomme *roulette en fibre plate tressée alterne sur âme continue*. La seconde se caractérise par un tressage croisé à chaque pas ; on la dénomme *roulette en fibre plate tressée croisée sur âme continue* (Figure 1.25). Il est possible qu'il existe d'autres variantes de tressage avec un nombre de brins différents, mais nous n'en connaissons aucun exemple ethnographique. Il faut noter qu'il est difficile de déduire le nombre de brins utilisés ou le geste technique à la seule vue de l'outil terminé.[6]

Distribution

The spatial distribution of these roulettes is highly concentrated, since their use has been observed to date only in the south-central and southern parts of Mali (Frank 1998, 2007; Gallay *et al.* 1998; Mayor 2005), northern Ivory Coast (Lhote 1977, fig.7), western and southern Burkina Faso (Diawara 1989; Sanou 1990; Some 1990; Millet 1994; Virot 1994, 2005; Mayor 2005; Livingstone Smith, pers. obs.), northern Togo (Kreamer 2000; Livingstone Smith, pers. obs.), northern Nigeria (roulette collected by Balfour in Katsina, northern Nigeria in 1930, Pitt Rivers Museum [1930.43.25–32]; illustrated in Haour 2003, fig.7.19), and probably northern Ghana (A. Craven, pers. comm., 2009). If we exclude the early example from northern Nigeria, the distribution is nearly continuous. The eastern limit of the area of extension is clearly identifiable, since it ends with the Gourmantche (Burkina Faso and southern Niger), a population in which artisans use roulettes of wood, maize cobs, twisted cords and springs, but not braided strip roulettes on a continuous core. Systematic surveys carried out further to the east (northern Benin and Niger) by O. Gosselain demonstrate that such tools are unknown there. To the north-east, the distribution ends with the Moore (Mossi) (Burkina Faso), where only a few artisans use – or claim to have used – *braided strip roulettes on a continuous core*.

Another interesting issue relating to the distribution of these roulettes is their association with two linguistic groups of the Niger-Congo family: the Gur group (Volta-northern Congo) and the North Mande group (Mayor 2005). The position occupied in this second group, to the extreme east of its distribution spread, indicates that this tool may have initially been associated with the Gur group. We note, however, that several populations belonging to this linguistic group use other roulette categories.

The use of braided strip roulettes is often combined with that of other roulettes: twisted cords (Kreamer 2000), carved wooden roulettes (Virot 1994, 2005; Frank 1998; Gallay *et al.* 1998; Livingstone Smith, pers. obs.), maize cobs (Some 1990; Livingstone Smith, pers. obs.), *Blepharis ciliaris* cobs (Gallay *et al.* 1998, Livingstone Smith, pers. obs.) and springs (Some 1990). It is of note that braided strip roulettes never occur together with other types of strip roulette but that they are very frequently associated with wooden roulettes.

Complementary data

The materials used to make *braided strip roulettes on a continuous core* are often described as 'dried grass' or 'straw'. More precise descriptions are sometimes offered: strands of *Loudetia togoensis* (Sanou 1990) or fibres of *Viteveria nigritina* (Some 1990). The data collected by Sanou (1990, 104) among the Bobo of Pala (Burkina Faso) indicate that potters distinguish between alternate braiding and non-alternate braiding variants. The first type is considered prettier and is mainly used to decorate the shoulder of large jars; this roulette is also less common because few potters know how to make it.

The difficulty inherent in making *braided strip roulettes on a continuous core* has also been emphasised by the Kabye potters of northern Togo: unable to make the roulettes themselves, they obtain them from men who braid the roulettes during the wet season (Livingstone Smith, pers. obs.). Indeed, the fabrication technique for these tools

Distribution

La distribution spatiale de ces roulettes est fortement concentrée, puisque leur usage n'est observé aujourd'hui qu'au centre-sud et sud du Mali (Frank 1998, 2007 ; Gallay *et al.* 1998 ; Mayor 2005), au nord de la Côte d'Ivoire (Lhote 1977, fig.7), à l'ouest et au sud du Burkina Faso (Diawara 1989 ; Sanou 1990 ; Some 1990 ; Millet 1994 ; Virot 1994, 2005 ; Mayor 2005 ; Livingstone Smith, observ. pers.), au nord du Togo (Kreamer 2000 ; Livingstone Smith, observ. pers.), au nord du Nigeria (roulette collectée en 1930 par Balfour à Katsina, Pitt Rivers [1930.43.25–32] ; illustrée par Haour 2003, fig.7.19) et sans doute au nord du Ghana (A. Craven, comm. pers., 2009). Si l'on excepte l'exemple attesté anciennement au nord du Nigeria, il s'agit d'une distribution pratiquement continue. La limite orientale de l'aire d'extension est clairement identifiable, puisqu'elle s'arrête avec les Gourmantche (Burkina Faso/sud du Niger), une population dans laquelle les artisans se servent de roulettes en bois, de rafles de maïs, de cordelettes torsadées ou de ressorts, mais pas de fibres plates tressées sur âme continue. Les enquêtes systématiques menées plus à l'est (nord du Bénin et Niger) par O. Gosselain montrent qu'un tel outil y est inconnu. Au nord-est, la distribution s'arrête au niveau des Moore (Mossi) (Burkina Faso), chez lesquels quelques artisans seulement utilisent – ou disent avoir utilisé – des roulettes en *fibre plate sur âme continue*.

Un autre élément intéressant du point de vue de la distribution de ces roulettes est leur association avec deux groupes linguistiques de l'ensemble Niger-Congo : le groupe Gur (Volta-Congo Nord) et le groupe Mande Nord (Mayor 2005). La position occupée dans ce second groupe, à l'extrême est de son aire de distribution, indique que l'outil a pu être initialement associé au groupe Gur. Notons cependant que plusieurs populations appartenant à ce groupe linguistique utilisent d'autres catégories de roulette.

L'usage des fibres plates tressées se combine souvent à celui d'autres roulettes : cordelettes torsadées (Kreamer 2000), roulettes en bois taillé (Virot 1994, 2005 ; Frank 1998 ; Gallay *et al.* 1998 ; Livingstone Smith, observ. pers.), rafles de maïs (Some 1990 ; Livingstone Smith, observ. pers.), épis de *Blepharis ciliaris* (Gallay *et al.* 1998, Livingstone Smith, observ. pers.), ressort (Some 1990). On remarquera l'absence complète d'autres roulettes réalisées à l'aide de fibres plates, et l'association très fréquente avec des roulettes en bois.

Données complémentaires

Les matériaux servant à fabriquer les roulettes *en fibre plate tressée sur âme continue* sont souvent décrits comme de l''herbe sèche' ou de 'la paille'. Quelques précisions apparaissent parfois : brins de *Loudetia togoensis* (Sanou 1990) ou fibres de *Viteveria nigritina* (Some 1990). Les informations collectées par Sanou (1990, 104) chez les Bobo de Pala, au Burkina Faso, montrent que les potières distinguent les variantes avec inversion de tressage (à savoir les roulettes alternes) et sans inversion. Jugées plus jolies, les premières sont surtout utilisées pour orner l'épaule des grandes jarres. Elles sont aussi plus rares car peu de potières savent en fabriquer.

La difficulté de fabrication des roulettes en *fibres plates sur âme continue* est également soulignée par des potières Kabye du nord du Togo : incapables de les confectionner elles-mêmes, elles les obtiennent auprès d'hommes qui les tressent en saison humide (Livingstone Smith, observ. pers.). La technique de fabrication de ces outils restait

remained poorly understood by ethnologists until now, which has led to the usage of varied and sometimes inadequate terminologies.[7] These ethnographic tools have thus been referred to as *'tresses de paille'* (Millet 1990), *'tresses simples et alternes'* (Gallay *et al.* 1996, 1998; Mayor *et al.* 2005), twisted/knotted fibre roulettes (Haour 2003), *'fibres plates nouées en scoubidou cylindrique simple ou inversé'* (Langlois 2004, http://cerafim.free.fr/), *'scoubidou cylindrique simple ou alterne'* (Mayor 2005), alternate knotted strip roulettes or *'scoubidou'* (Livingstone Smith 2007) or, finally, braided fibre roulettes (Frank 2007).

Roulettes on an independent core

As we indicated above, the category of tools on an *independent core* also includes two sub-groups: roulettes on *a single core*, and those on *multiple cores*.

Roulettes on a single independent core

Fabrication method and impressions

In the first case, we are dealing with tools consisting of a cord wrapped around a core of wood, bone, or metal. In this case, the impression shows lines of corded impressions that are more or less parallel (0–10 degrees from horizontal) and are more or less contiguous depending on the spacing of the wrapped cord around the core. These impressions are similar to those of the cord *on continuous core* roulette, but the latter have a tendency to be more irregular given the flexibility of the core. There are also roulettes on independent core which involve one or two inter-crossed cords, creating a series of X-like impressions (Figures 1.26 and 1.28). These can be confused with the impressions made by a knotless net (Figure 1.31). One variant consists of wrapping or crossing a metallic wire over a stick, an iron rod, or a piece of straw (Figure 1.27). Apart from the usage of a metallic material, what distinguished this variant from the others is that the impression obtained does not show the segments that are characteristic of a twisted cord.

Distribution

As we indicated, our choice to maintain a single category of tools *on a single independent core*, independently of the nature of the material used as a wrap, derives from geocultural and historical considerations. Today, the use of such tools is found in two distinct regions: northern Senegal (Toucouleur, Soninke, Fulani Wayilbe) and the Hausa area, straddling Nigeria and Niger. Potential connections between these two zones remain unknown, but within each, 'cord' and 'metal wire' variants coexist or seem to have succeeded one another in time.

In northern Senegal, among the Toucouleur, Soninke and Fulani Wayilbe (Gelbert 1997, 2003; Guèye 1998), as well as in north-western Nigeria, among the Kebbawa Hausa (Leith-Ross 1970, 35), artisans use a wooden cylinder around which is wrapped and knotted a cord made of fibre or cotton. Guèye (1998) adds that the tool is used to make rolled as well as single impressions. Among the Soninke, its use sometimes coexists with the use of maize cobs (Gelbert 1997) and twisted cord roulettes (Guèye

d'ailleurs mal comprise jusqu'à présent chez les ethnologues, ce qui a eu pour conséquence l'utilisation de terminologies variées et parfois impropres.[7] Les outils ethnographiques ont ainsi été qualifiés de tresses de paille (Millet 1990), de tresses simples et alternes (Gallay *et al.* 1996, 1998 ; Mayor *et al.* 2005), de '*twisted/knotted fibre roulette*' (Haour 2003), de fibres plates nouées en scoubidou cylindrique simple ou inversé (Langlois 2004, http://cerafim.free.fr/), de scoubidou cylindrique simple ou alterne (Mayor 2005), d'*'alternate knotted strip roulette*' ou de scoubidou (Livingstone Smith 2007), ou enfin de *'braided fibre roulette*' (Frank 2007).

Roulettes sur âme indépendante

Comme nous l'avons indiqué plus haut, les outils sur *âme indépendante* comprennent également deux sous-catégories: les roulettes sur *âme simple* et sur *âme multiple*.

Roulettes sur âme indépendante simple

Méthode de fabrication et empreintes

Il s'agit d'outils constitués d'une cordelette torsadée enroulée autour d'une âme en bois, en os, ou en métal. L'impression se caractérise par des lignes cordées plus ou moins parallèles (0–10 degrés par rapport à l'horizontale) et plus ou moins serrées, en fonction de l'espace qui a été laissé sur l'âme entre chaque révolution de la corde qui l'entoure. Ces impressions se rapprochent de celles de la cordelette *sur âme continue*, qui ont toutefois tendance à présenter un aspect plus irrégulier vu la flexiblité de l'âme. Il existe aussi des roulettes sur âme indépendante qui comportent une ou deux cordelettes entrecroisées, créant alors un motif composé d'une série de X (Figures 1.26 et 1.28). Cette impression peut se confondre avec celle d'un filet sans nœuds (Figure 1.31). Une variante consiste à enrouler ou entrecroiser un fil métallique sur un bâtonnet, une tige en fer ou un segment de paille (Figure 1.27). Hormis l'utilisation d'un matériau métallique, ce qui distingue cette variante des outils précédents c'est que l'impression obtenue ne comporte pas les segments caractéristiques d'une cordelette torsadée.

Distribution

Le choix de maintenir une seule catégorie d'outils *sur âme indépendante simple*, indépendamment de la nature du matériau qui enveloppe l'âme, découle de considérations géoculturelles et historiques. À l'heure actuelle, l'usage de tels outils est attesté dans deux zones distinctes : le nord du Sénégal (Toucouleur, Soninke, Peul Wayilbé) et l'aire Hausa, à cheval sur le nord du Nigeria et le sud du Niger. Les connexions éventuelles entre ces deux zones restent inconnues, mais au sein de chacune d'elles, les variantes 'à cordelette' et 'à fil métallique' cohabitent ou paraissent s'être succédé dans le temps.

Au nord du Sénégal, en pays toucouleur, soninké et peul Wayilbé (Gelbert 1997, 2003 ; Guèye 1998), ainsi qu'au nord-ouest du Nigeria, chez les Hausa Kebbawa (Leith-Ross 1970, 35), les artisans se servent d'un cylindre en bois autour duquel est enroulée et nouée une cordelette de fibres ou de coton. Guèye (1998) précise que l'outil sert aussi bien à réaliser des impressions roulées que simples. Chez les Soninke, son usage coexiste parfois avec celui de la rafle de maïs (Gelbert 1997) et de la cordelette torsadée (Guèye

1998). Among the Kebbawa Hausa, the cord can also be wrapped and knotted around a blade of straw (Leith-Ross 1970, 35). This is similar to the example of a cord roulette on a bone core, collected by A. Livingstone Smith from a Moba potter in northern Togo (Figures 1.26 and 1.28).

The spatial distribution of the metallic wire on a single independent core roulette testifies to a historical connection with the category of cord-wrapped bone, wood, cord or metal, of which it often constitutes a modern variant. The metallic wire on wood, iron or straw core roulette is indeed found in northern Senegal among the Toucouleur (Lagoutte 1987, 1988), south-east Guinea (Kpelle; it is then a *"cône en fer entouré d'une spirale métallique en relief"* [Germain 1955, 12]) and in the central-southern part of Niger among Hausa potters of the Maradi region (Gosselain, pers. obs.). In this last case, copper wires are twisted and wrapped in different patterns around a nail or a blade of straw, in order to produce unique motifs that the potters sometimes consider akin to signatures (Figure 1.27). Observations in the field (Gosselain, pers. obs.) reveal that such tools succeeded, or coexisted with, twisted cord roulettes or carved inflorescences of *Blepharis linariifolia*. In Senegal, Toucouleur potters alternatively used maize cobs (Guèye 1998; Gelbert 2003).

Roulettes on multiple independent cores

Fabrication method and impressions

Roulettes on *multiple cores* are made using three, or more, rigid cores around which one (or several) cords are interlaced (Figure 1.29). The impressions appear as vertical, stacked segments, each column separated from the next by a zone devoid of impressions (Figure 1.30).

These impressions can be confused with single impressions of a straight mat made of cords, which have the same structure; but the empty zone is, however, quite limited in the case of matting (Figures 1.32 to 1.35). Hurley (1979, 104–107) illustrates several experimental examples. More complex examples also exist within this group, formed, for example, of a core composed of numerous elements, around which one or more cords or fibres are braided or knotted (see the CERAFIM web site).[8] Countless other variations could be imagined, as show the experimental reconstructions by Hurley (1979) and the archaeological observations of MacDonald and Manning (section 3, this volume).

Distribution

Usage of this roulette is restricted to a zone between the Lake Chad Basin and the northern part of the Great Lakes region. This tool is found in the extreme north of Cameroon among the Tupuri (Langlois 2004), in the extreme south of Chad among the Sara (Langlois *et al.* 1998) and in the extreme south of Sudan among the Moru (Barley 1994, 39[9]; Pitt Rivers Museum [1979.20.27][10]).

Archaeological data compiled by Langlois (2004) show that the zone in which this tool was used was once greater, and extended to Diamaré (North Cameroon), from the fourth century AD. The current distribution of this tool does not allow us to draw conclusions in terms of cultural history since it occurs in two different linguistic phyla (Benue-Congo and Nilo-Saharan) without geographic proximity.

1998). Chez les Hausa Kebbawa, la corde peut aussi être enroulée et nouée autour d'un brin de paille (Leith-Ross 1970, 35). On se rapproche alors d'un exemple de roulette en corde sur âme en os, collectée par A. Livingstone Smith chez une potière Moba au nord du Togo (Figures 1.26 et 1.28).

La distribution spatiale de la roulette composée d'un fil métallique enroulé autour d'une âme indépendante simple témoigne d'une connexion historique avec la catégorie de la roulette de cordelette sur âme de bois, os, corde ou métal, dont elle constitue souvent une 'variante moderne'. La roulette de fil métallique sur âme de bois, fer ou paille se retrouve en effet au nord du Sénégal, en pays toucouleur (Lagoutte 1987, 1988), au sud-est de la Guinée (Kpelle ; il s'agit alors d'un "cône en fer entouré d'une spirale métallique en relief " [Germain 1955, 12]) et au centre-sud du Niger, chez les potiers Hausa de la région de Maradi (Gosselain, observ. pers.). Chez ces derniers, des fils de cuivre sont tordus et enroulés autour d'un clou ou d'une paille selon diverses modalités, afin de produire des motifs singuliers que les potiers assimilent parfois à des signatures (Figure 1.27). Les données de terrain (Gosselain, observ. pers.) montrent que de tels outils ont été précédés ou ont cohabité avec des cordelettes torsadées ou des inflorescences taillées de *Blepharis linariifolia*. Au Sénégal, les potières toucouleur se servent alternativement de rafles de maïs (Guèye 1998 ; Gelbert 2003).

Roulettes sur âme indépendante multiple

Méthode de fabrication et empreintes

Les roulettes sur *âme multiple* se composent de trois âmes rigides, ou davantage, autour desquelles une ou plusieurs cordelettes sont entrecroisées (Figure 1.29). Les impressions se présentent comme des colonnes de segments de cordelette empilés, chaque colonne étant séparée de la suivante par une zone libre d'impressions (Figure 1.30).

Ces impressions peuvent se confondre avec des impressions directes de vannerie droite à brins cordés, qui présentent la même structure, la zone libre d'impression étant néanmoins très limitée dans le cas de la vannerie (Figures 1.32 à .35). Hurley (1979, 104–107) en illustre plusieurs exemples expérimentaux. Des outils plus complexes existent également dans cette catégorie, constitués, par exemple, d'une âme comportant de nombreux éléments, autour desquels une ou plusieurs cordes ou fibres sont tressées ou nouées (voir le site web CERAFIM).[8] On peut imaginer bien d'autres variations, comme l'illustrent les reconstitutions expérimentales de Hurley (1979) et les observations archéologiques de MacDonald et Manning (section 3, ce volume).

Distribution

L'usage de cet outil est circonscrit à une zone comprise entre le Bassin du Lac Tchad et le nord de la région des Grand Lacs. On le retrouve en effet à l'extrême nord du Cameroun, en Pays tupuri (Langlois 2004), à l'extrême sud du Tchad, en Pays sara (Langlois *et al.* 1998) et à l'extrême sud du Soudan en Pays moru (Barley 1994, 39 ;[9] collections du Pitt Rivers Museum [1979.20.27][10]).

Les données archéologiques réunies par Langlois (2004) montrent que cette zone était autrefois plus vaste et s'étendait au Diamaré (nord Cameroun), dès le quatrième siècle de notre ère. Sa distribution actuelle ne permet pas de tirer de conclusions en termes d'histoire culturelle, puisqu'elle s'étend à deux phylums linguistiques différents (Benue-Congo et Nilo-Saharien), sans relation de proximité géographique.

Roulettes consisting of modified materials

Carved wooden or bone cylinders

Fabrication method and impressions

This type of tool is made by carving or applying pokerwork to a small cylinder of wood or bone (Bandler and Bandler 1977), so as to create geometric patterns. Examples known today are mostly carved using a knife, but some are also made by applying a pre-heated tip of a blade or iron rod (Gosselain, pers. obs.). As mentioned by Soper (1985, 33), wooden roulettes are often used to create bands of geometric decoration with clear edges. They can, however, be used to decorate a much larger surface area of a vessel. Among the Golo in Sudan, for example, the base of large jars for the storage of water or beer is covered with carved wooden roulette impressions (Crowfoot 1925). The impressed unit is very strongly limited horizontally and vertically, but involves a complex pattern. The impression produced is continuous, and will vary according to the pattern engraved on the cylinder (Figure 1.36). As such, there is no real symptomatic configuration, apart from a cycle of repetition of variable length. The presence of faults can sometimes be observed, due to cracking of the tool.

Distribution

This category of roulette demonstrates a startling contrast in its distribution. There exists, on the one hand, a vast continuous zone, occupying the centre of the larger area within which rolled tools are used. The existence of this zone is well-known; it was noted by David and Vidal (1977), although they underestimated its extent (Gosselain 2000). To the west of it, a series of isolated occurrences can be observed, and it is difficult to know whether historical links formerly existed between them. Available archaeological data do not give the impression that these isolated occurrences constitute the remnants of a once greater and more uniform distribution (Livingstone Smith 2007).

The zone through which carved roulettes occur continuously spans southern Togo (Livingstone Smith, pers. obs.), southern Benin (Herskovits 1938; Savary 1970; David and Vidal 1977; Rivallain 1981; M. David 1983; Gosselain, pers. obs), the lower two thirds of Nigeria (Meek 1931; Nicholson 1934; Murray 1943; Drost 1967; Willett and Connah 1969; Leith-Ross 1970; Fagg 1972; Bandler and Bandler 1977; Strybol 1985; Okpoko 1987; Fatunsin 1992; Barley 1994; Virot 2005), Cameroon (excluding the extreme north) (Zenker 1895; Hoesemann 1903; Tessmann 1913, 1928; Thorbecke 1919; Baumann 1925; Sieber 1925; Baumann and Vajda 1959; David and Vidal 1977; Mori 1984; Swartz 1989; Elouga 1993; Gosselain 1995; Gosselain *et al*. 1996), south-west Chad (Hottot 1934; Langlois *et al.* 1998), the southern part of the Central African Republic (Harttmann 1927; Daigre 1931; Tessmann 1934; Vergiat 1937; David and Vidal 1977), south-west Sudan (Crowfoot 1925; Powell-Cotton 1934), the northern part of Congo-Brazzaville (Poutrin 1910; Tessmann 1934; David and Vidal 1977), the northern part of the Democratic Republic of the Congo (Coart and de Hauleville 1907; Trowell 1960; David and Vidal 1977; Schildkrout *et al*. 1989; Barley 1994; ethnographic collections of the MRAC; Kanimba 1996; Mercader *et al*. 2000), Uganda (Roscoe 1923; O'Brien and Hastings 1933; Schebesta 1934; Trowell and Wachsmann 1953; Jensen 1969; Soper 1971), and north-west Kenya (Barbour 1989; Wandibba 1989, 1990). The populations involved speak languages

Roulettes constituées de matériaux modifiés

Cylindres taillés en bois ou en os

Méthode de fabrication et empreintes

Ce type d'outil est obtenu en taillant ou en pyrogravant un petit cylindre de bois ou d'os (Bandler et Bandler 1977), de façon à y imprimer des motifs géométriques. Les exemples connus aujourd'hui ont surtout été taillés à l'aide d'un couteau, mais quelques-uns sont également pyrogavés avec la pointe d'une lame ou une tige en fer préalablement chauffée (Gosselain, observ. pers.). Comme le fait remarquer Soper (1985, 33), la roulette en bois sert le plus souvent à réaliser des bandes clairement délimitées de décors géométriques. Elle peut néanmoins être utilisée pour produire des décors couvrants ou semi-couvrants. Chez les Golo du Soudan, par exemple, le fond des grandes jarres destinées à contenir l'eau ou la bière est couvert d'impressions à la roulette en bois (Crowfoot 1925). L'unité imprimée est bien limitée horizontalement et verticalement, mais il s'agit à chaque fois d'un motif complexe. L'empreinte produite est continue et dépend du motif gravé sur le cylindre (Figure 1.36). Il n'y a donc pas réellement de configuration symptomatique si ce n'est un cycle de répétition de longueur variable. On note parfois la présence de défauts liés à la fissuration de l'outil.

Distribution

La distribution de cette catégorie de roulette témoigne d'un étonnant contraste. Il y a, d'une part, une vaste zone continue, qui occupe le centre de l'aire au sein de laquelle sont utilisés des outils roulés. Bien connue, l'existence de cette zone avait déjà été évoquée par David et Vidal (1977), qui en sous-estimaient néanmoins l'ampleur (Gosselain 2000). A l'ouest de celle-ci, on observe par ailleurs une série d'occurrences isolées dont il est difficile de savoir si elles entretiennent des liens historiques entre elles. Les données archéologiques disponibles ne donnent pas l'impression que ces isolats constituent des résidus d'une distribution autrefois plus large et homogène (Livingstone Smith 2007).

La zone dans laquelle l'usage des roulettes taillées apparaît en continu comprend le sud du Togo (Livingstone Smith, observ. pers.), le sud du Bénin (Herskovits 1938; Savary 1970; David et Vidal 1977; Rivallain 1981; M. David 1983; Gosselain, observ. pers.) , les deux tiers inférieurs du Nigeria (Meek 1931; Nicholson 1934; Murray 1943; Drost 1967; Willett et Connah 1969; Leith-Ross 1970; Fagg 1972; Bandler et Bandler 1977; Strybol 1985; Okpoko 1987; Fatunsin 1992; Barley 1994; Virot 2005) , le Cameroun (à l'exception de l'extrême nord) (Zenker 1895; Hoesemann 1903; Tessmann 1913, 1928; Thorbecke 1919; Sieber 1925; Baumann et Vajda 1959; David et Vidal 1977; Mori 1984; Swartz 1989; Elouga 1992; Gosselain 1995; Gosselain *et al*. 1996) , le sud-ouest du Tchad (Hottot 1934 ; Langlois et al. 1998) , le sud de la Centrafrique (Harttmann 1927; Daigre 1931; Tessmann 1934; Vergiat 1937; David et Vidal 1977) , le sud-ouest du Soudan (Crowfoot 1925 ; Powell-Cotton 1934) , le nord du Congo-Brazzaville (Poutrin 1910; Tessmann 1934; David et Vidal 1977) , le nord de la R. D. Congo (Coart et de Hauleville 1907; Trowell 1960; David et Vidal 1977; Schildkrout *et al*. 1989; Barley 1994; ethnographic collections of the MRAC; Kanimba 1996; Mercader *et al*. 2000) , l'Ouganda (Roscoe 1923; O'Brien et Hastings 1933; Schebesta 1934; Trowell et Wachsmann 1953; Jensen 1969; Soper 1971) , le nord-ouest du Kenya (Barbour 1989 ; Wandibba 1989, 1990). Les

belonging to several of the groups and families represented in Africa: Niger-Congo (Mande, Gur, Kwa, Benue-Congo, Adamawa-Oubangian, Bantoid, Bantu), Afroasiatic (Chadic) and Nilo-Saharan (Central Sudanic, Eastern Sudanic). The more peripheral presence in the Afroasiatic and Nilo-Saharan families suggests that these populations are not likely to have been the initiators of this tool category. However, if we associate its origin with the Niger-Congo populations, several groups can be considered. And if, as David and Vidal (1977) suggested, the propagation of carved roulettes outside their area of origin may be linked to Adamawa-Oubangian population movements, this contribution constitutes a mere epiphenomenon within a much larger process.

Isolated occurrences of carved roulettes are observed in south-east Guinea (Paulme 1954), north-west Liberia (Germann 1933), central and south-east Mali (Frank 1993, 1998, 2007; Gallay *et al.* 1998), western and eastern Burkina Faso (Calvocoressi 1977; Virot 2005; Livingstone Smith, pers. obs.) and the extreme north of Togo (Livingstone Smith, pers. obs.). In Guinea and Liberia, the two populations involved (Kisi and Bandi) are neighbours, and we know that amongst the Kisi, women who make pots are of foreign origin (e.g. Malinke, Kouranko, Toma, Lele [Paulme 1954]). Introduction of the tool may have been the result of displaced individuals coming in from regions where its use is known. An illustration of the individual and near-accidental nature of the introduction of a carved roulette is the example of a Bariba potter in northern Benin, using a carved roulette that she bought during a short visit to Cotonou, while other potters around her use cord roulettes (Gosselain, pers. obs.). Another example of an introduction possibly linked to population displacements is offered by the case of the Folona potters in south-east Mali, who have historical connections with griot communities in south-west Burkina Faso (Frank 2007), a region in which the carved roulette is used. Further to the east, among the Gurmantche communities of Burkina Faso, northern Togo and northern Benin, carved wooden roulettes appear to be more broadly established.

Complementary data

To our knowledge, the carved roulette is the only tool that is rarely made by the potters themselves. While the available data are somewhat lacunary, it appears that their manufacture has typically been assigned to men, and sometimes more specifically to blacksmiths – as is woodworking in general. When men make pottery, they may also make the roulettes, as is sometimes the case among the Gurmantche of Benin (Gosselain, pers. obs.). However, women potters tend to obtain the tool from specialised woodcarvers, either within their own community (Nicholson 1934; Gosselain 1995; Livingstone Smith 2007) or outside of it. This factor may have affected the spatial propagation of carved roulettes. Among the Nupe of Abuja (Nigeria), for example, women used tools made by Gwari carvers (Nicholson 1934, 70). Among the Mumuye (Nigeria), Strybol (1985) has also observed that some potters bought at markets roulettes that had been made beyond their own village. Conversely, this sort of technological

populations concernées parlent des langues qui appartiennent à plusieurs des groupes et familles représentées sur le continent : Niger-Congo (Mande, Gur, Kwa, Benue-Congo, Adamawa-Oubangien, Bantoïde, Bantu), Afro-Asiatique (Tchadique), Nilo-Saharien (Soudanais Central, Soudanais Oriental). La présence plus périphérique dans les familles Afro-Asiatique et Nilo-Saharienne n'invite pas à considérer les populations concernées comme initiatrices de cette catégorie d'outil. Toutefois, s'il faut en associer l'origine à des populations Niger-Congo, plusieurs groupes sont envisageables. Et si, comme le suggéraient David et Vidal (1977), la propagation des roulettes taillées hors de leur aire d'origine pourrait être liée aux mouvements de populations adamawa-oubangiennes, la contribution de ces dernières ne constitue qu'un épiphénomène dans un processus d'une ampleur beaucoup plus large.

Les occurrences isolées de la roulette taillée se rencontrent au sud-est de la Guinée (Paulme 1954), au nord-ouest du Liberia (Germann 1933), au centre et au sud-est du Mali (Frank 1993, 1998, 2007 ; Gallay *et al.* 1998 ; Mayor 2005, sous presse), à l'ouest et est du Burkina Faso (Calvocoressi 1977 ; Virot 2005 ; Livingstone Smith, observ. pers.,) et à l'extrême nord du Togo (Livingstone Smith, observ. pers.). En Guinée et au Liberia, les deux populations concernées (Kisi et Bandi) sont voisines et on sait que parmi les Kisi, les femmes qui exercent l'activité de la poterie sont d'origine étrangère (Malinke, Kouranko, Toma, Lele [Paulme 1954]). L'introduction de l'outil pourrait donc résulter de déplacements d'individus originaires de régions où son usage est attesté. Le caractère individuel et presque accidentel de l'introduction d'une roulette taillée a en tout cas été documenté chez une potière Bariba du nord Bénin, qui se sert d'un outil acheté lors d'un séjour de courte durée à Cotonou, alors que toutes les femmes de la région utilisent une cordelette (Gosselain, observ. pers.). Autre exemple d'une introduction éventuellement liée à des déplacements de populations : les potières de Folona, au sud-est du Mali, qui entretiennent des liens historiques avec les communautés de griots au sud-ouest du Burkina Faso (Frank 2007), une région dans laquelle la roulette taillée est en usage. Plus à l'est, dans les communautés Gurmantche du Burkina Faso, du nord Togo et du nord Bénin, la roulette en bois semble plus largement implantée.

Données complémentaires

A notre connaissance, la roulette taillée est le seul outil qui ne soit qu'exceptionnellement fabriqué par les potiers et potières. Même si les données disponibles restent très lacunaires, il semble en fait que leur réalisation soit dévolue aux hommes, et parfois plus particulièrement aux forgerons – comme le travail du bois en général. Lorsque ce sont les hommes qui fabriquent la poterie, ils peuvent alors confectionner l'outil eux-mêmes, comme c'est parfois le cas chez les Gurmantche du Bénin (Gosselain, observ. pers.). Mais les femmes s'approvisionnent le plus souvent auprès d'artisans spécialisés dans travail du bois, soit dans leur propre communauté (Nicholson 1934 ; Gosselain 1995 ; Livingstone Smith 2007), soit ailleurs. Il s'agit d'un facteur qui pourrait avoir pesé sur la propagation spatiale des roulettes taillées. Chez les Nupe d'Abuja (Nigeria), par exemple, les femmes se servaient d'outils fabriqués par des tailleurs gwari (Nicholson 1934, 70). En pays mumuye (Nigeria), Strybol (1985) a également observé que certaines potières achetaient sur les marchés les roulettes que l'on fabriquait dans d'autres villages que le leur. En retour, la dépendance technique justifie que l'usage puisse brutalement

dependency means that if the roulettes can no longer be obtained, their usage can be brought to an abrupt end. Among the Dii of Mbé, in northern Cameroun, for example, potters were unable to replace worn-out tools after the death of the local blacksmith, and were obliged to use cord roulettes instead (Livingstone Smith 2007, 204).

One of the paths requiring future investigation concerns the nature and variability of the motifs made on these roulettes. While the patterns are often monotonous and elementary (chevrons, horizontal or oblique grooves) in the west and on the northern and eastern peripheries of the principal zone of distribution, they are highly variable and complex in Benin, Nigeria and Cameroon, particularly within the Niger-Congo family (Kwa, Benue-Congo, Bantoid, Bantu and Adamawa-Oubangian groups). Here, the similarity of certain patterns and combinations is probably not due to chance, and may reveal internal sub-divisions in the distribution area, perhaps linked to distinct historical processes.

Inflorescences and fruits

Fabrication method and impressions

Several different domestic and wild plants are used to make roulettes. The parts used are generally the inflorescences, and more rarely the fruits. Preparation involves detaching the part that is to be used, removing any seeds, and/or carving lengthwise to free the parts which are to be impressed onto clay. The impressions produced by these tools vary greatly, depending on the characteristics of the plants used (Figure 1.37 to 1.39).

Specification and distribution

Maize cobs (*Zea mays*)

The grains of maize are first removed from the cob, and it is often then slightly burned and trimmed with a knife (see in particular Crossland 1989, 57). This process makes apparent a reticulate network of bladelets, which consitute the edges of the cob. It is this very confused reticulated network that is imprinted when the tool is rolled on fresh clay (Soper 1985, 32, Fig. 1). In many cases the main function of these impressions is considered to be reducing the chances of vessels slipping when held (Crossland and Poznansky 1978; Brenda-Menswa 1996; Cruz 2003; Berns 2007).

Considering the number of artisans who make use of maize cobs during the pottery manufacturing process – particularly for scraping and forming the walls – the use of these objects for decorative purposes seems to be surprisingly limited: north-east Senegal (Lagoutte 1987, 1988; Thiam 1991; Gelbert 1997), north-east Guinea (Corbeil 1946), central Mali (Frank 1998), south and central Burkina Faso (Banaon 1986, 1990; Roy 1987; Kientega 1988; Some 1990), Ghana (Cobblah 1965; Priddy 1971; Owusu-Ansah 1973; Crossland and Posnansky 1978; Effah-Gyamfi 1980; Crossland 1989; Bredwa-Mensah 1996; Cruz 2003; Berns 2007), central Togo (Froelich *et al*. 1963; Tondeur 1996; Livingstone Smith, pers. obs.), southern and eastern Nigeria (Nwafor 1980; Arua and Oyeoku 1982; Okpoko 1987; Cattini-Muller 1998), northern Democratic Republic of Congo (Burssens 1958; McMaster 1988), and Rwanda (Virot 2005).

s'interrompre, lorsqu'il n'est plus possible de s'approvisionner en outil. Chez les Dii de Mbé, au Nord Cameroun, les potières n'ont pu remplacer leurs outils usagés après la mort du forgeron local et se sont alors contentées d'utiliser des cordelettes (Livingstone Smith 2007, 204).

L'une des pistes à explorer dans le futur concerne la nature et la variabilité des motifs réalisés sur les roulettes. Souvent monotones et élémentaires (chevrons, cannelures horizontales ou obliques) à l'ouest et en périphérie septentrionale et orientale de la principale zone de distribution, ils connaissent une variabilité et une complexité exceptionnelle au Bénin, au Nigeria et au Cameroun, tout particulièrement au sein de la famille Niger-Congo (groupes Kwa, Benue-Congo, Bantoïde, Bantu et Adamawa-Oubangi). Dans ce cas, la ressemblance de certains motifs et combinaisons ne tient sans doute pas du hasard et pourrait révéler des subdivisions internes dans l'aire de distribution, liées peut-être à des processus historiques distincts.

Inflorescences et fruits

Méthode de fabrication et empreintes

Un certain nombre de plantes domestiques et sauvages sont utilisées pour confectionner des roulettes. Les parties utilisées sont généralement les inflorescences et plus rarement les fruits. Leur manipulation consiste alors à trancher la partie utilisée, à en éliminer les grains éventuels et/ou à les tailler longitudinalement pour dégager les éléments que l'on souhaite imprimer sur l'argile. L'empreinte produite par l'outil ainsi obtenu varie fortement en fonction des spécificités de la plante dont il est tiré (Figures 1.37 à .39).

Spécification et distribution

Rafle de maïs (*Zea mays*)

L'épi est préalablement débarrassé des graines puis souvent passé au feu et ébarbé à l'aide d'une lame (voir notamment Crossland 1989, 57). L'artisan fait ainsi apparaître un réseau réticulé de lamelles qui constitue la périphérie de la rafle de maïs. C'est ce réseau réticulé, très confus, qui s'imprime lorsque l'outil est roulé sur l'argile fraîche (Soper 1985, 32, Fig. 1). Dans de nombreux cas, on considère que les impressions résultantes ont surtout pour fonction d'éviter que les récipients ne glissent des mains (Crossland et Posnansky 1978; Brenda-Menswa 1996; Cruz 2003; Berns 2007).

Compte tenu du nombre d'artisans qui se servent de rafles de maïs au cours du processus de manufacture d'une poterie – tout particulièrement lors du raclage et de la mise en forme des parois – l'utilisation de ces objets à fins ornementales paraît étonnamment restreinte : nord-est du Sénégal (Lagoutte 1987, 1988; Thiam 1991; Gelbert 1997) , nord-est de la Guinée (Corbeil 1946) , centre du Mali (Frank 1998) , sud et centre du Burkina Faso (Banaon 1986, 1990 ; Roy 1987 ; Kientega 1988 ; Some 1990) , Ghana (Cobblah 1965; Priddy 1971; Owusu-Ansah 1973; Crossland et Posnansky 1978; Effah-Gyamfi 1980; Crossland 1989; Bredwa-Mensah 1996; Cruz 2003; Berns 2007) , centre du Togo (Froelich *et al*. 1963; Tondeur 1996; Livingstone Smith, observ. pers.) , sud et est du Nigeria (Nwafor 1980; Arua et Oyeoku 1982; Okpoko 1987; Cattini-Muller 1998) , nord de la République Démocratique du Congo (Burssens 1958 ; McMaster 1988) , et Rwanda (Virot 2005).

While the use of maize cob roulettes is often combined with other roulette categories, they can also be the only roulettes used in certain communities, which is particularly true in Ghana (Cobblah 1965; Owusu-Ansah 1973; Crossland and Posnansky 1978; Effah-Gyamfi 1980; Crossland 1989; Bredwa-Mensah 1996; Cruz 2003), but also in other regions (Corbeil 1946; Burssens 1958; Arua and Oyeoku 1982; Kientega 1988; McMaster 1988; Thiam 1991).

Blepharis linariifolia or *B. ciliaris*

This is a small plant of the Acanthus family, commonly found in Sahelian environments. It occurs in the north of Africa, within the Sahelian band all the way to Sudan, and from Egypt to Kenya; it is also widespread further east, throughout the Arabian Peninsula, and up to Iran (Halevy 1989, 110).

The part of the plant used is the ear. Its lateral leaves are removed with a knife to free the central vein, from which emerge a series of protrusions corresponding to the bases of the leaves. Sometimes, the central vein is hardened with fire to make it more durable. The impression takes the form of a staggered network of very tiny depressions (resulting from the individual protrusions), in the shape of horizontal figures of eight, of rectangles or of lozenges depending on how worn the tool is (Figure 1.37).

The use of this vegetal roulette seems marginal today with respect to the distribution of the plant. This roulette is encountered in central Mali (Gallay *et al.* 1998), western Burkina Faso (Banaon 1986, 1990; Kientega 1988; Millet 1994; Livingstone Smith, pers. obs.), southern Niger (Gosselain, pers. obs.), central and northern Nigeria (Pitt Rivers Museum [1930.43.45 and 1930.43.46]; Leoni and Prichett 1978;[11] Virot 2005), and northern Cameroon (Barley 1994; Gosselain *et al.* 1996).

Fruit of the *Casuarina equisetifolia*

The fruit, which looks like a small pine cone, comes from a tree in the Casuarinaceae family, originally from Australia. Details for its arrival in Africa are unknown, but the species is probably of very recent introduction. The fruit is carved lengthwise with a knife so as to expose a regular network of diamond shapes, which is impressed onto the clay when the tool is rolled (Figure 1.38).

Use of this tool has been documented in south-western Burkina Faso (Virot 2005), northern Togo (Tondeur 1996; Livingstone Smith, pers. obs.), and central Nigeria (Virot 2005).

Millet cobs (*Pennisetum glaucum*)

Once its grains have been removed, an ear of millet has a rough surface, marked by hundreds of minuscule protrusions (each forming the base of the flowers) (Figure 1.39). These protrusions are imprinted when the tool is rolled across clay, and the impression appears as a surface pitted with hundreds of tiny depressions.

The use of millet ear roulettes has been documented in northern Guinea (Corbeil 1946), central Burkina Faso (Zouré 2000; Livingstone Smith, pers. obs.), in central southern Niger (Gosselain, pers. obs.), and in central Nigeria (Virot 2005). These tools appear to be fairly rare and they are always found in combination with other roulette categories.

Si l'usage des rafles de maïs se combine souvent à celui d'autres catégories de roulettes, elles peuvent également être les seules roulettes en usage dans certaines communautés, ce qui est tout particulièrement le cas au Ghana (Cobblah 1965; Owusu-Ansah 1973; Crossland et Posnansky 1978; Effah-Gyamfi 1980; Crossland 1989; Bredwa-Mensah 1996; Cruz 2003), mais également dans d'autres régions (Corbeil 1946; Burssens 1958; Arua et Oyeoku 1982; Kientega 1988; McMaster 1988; Thiam 1991).

Blepharis linariifolia ou *B. ciliaris*

Petite plante de la famille des Acanthaceae, courante en milieu sahélien. On la retrouve dans le nord de l'Afrique, au sein de la bande sahélienne jusqu'au Soudan, et de l'Egypte au Kenya – elle est également répandue plus à l'est, dans toute la péninsule arabique et jusqu'en Iran (Halevy 1989, 110).

La partie de la plante utilisée est l'épi. Ses feuilles latérales sont éliminées à l'aide d'une lame et seule la nervure centrale est conservée, d'où partent une série de protubérances correspondant à l'implantation des feuilles. Parfois, le centre ligneux peut être durci au feu pour plus de durabilité. L'empreinte présente la forme d'un réseau en quinconce de toute petites dépressions résultant des protubérances individuelles, en forme de 8 couché, de rectangle ou de losange selon le degré d'usure de l'objet (Figure 1.37).

L'usage de cette roulette végétale paraît actuellement marginal par rapport à l'aire de distribution de la plante. On la retrouve au centre du Mali (Gallay *et al.* 1998), à l'ouest du Burkina Faso (Banaon 1986, 1990 ; Kientega 1988 ; Millet 1994 ; Livingstone Smith observ . pers.), au sud du Niger (Gosselain, observ. pers.), au centre et nord du Nigeria (collections Pitt Rivers Museum [1930.43.45 et 1930.43.46] ; Leoni et Prichett 1978 ;[11] Virot 2005), et au nord du Cameroun (Barley 1994 ; Gosselain *et al.* 1996).

Fruit du *Casuarina equisetifolia*

Le fruit, qui a l'apparence d'une petite pomme de pin, provient d'un arbre de la famille des Casuarinacées, originaire d'Australie. Les détails de son implantation en Afrique sont inconnus, mais l'espèce est sans doute d'introduction récente. Le fruit est retaillé longitudinalement à l'aide d'une lame, de manière à faire apparaître une sorte de maillage régulier constitué de losanges, qui s'imprime dans la pâte fraîche lorsque l'outil est roulé (Figure 1.38).

L'usage de cette roulette est documenté au sud-ouest du Burkina Faso (Virot 2005), au nord du Togo (Tondeur 1996 ; Livingstone Smith, observ. pers.), et au centre du Nigeria (Virot 2005).

Epi de mil (*Pennisetum glaucum*)

Après avoir débarrassé l'épi de mil de ses grains, la tige présente une surface rugueuse, constituée de centaines de minuscules protubérances constituant la base des fleurs (Figure 1.39). Ce sont ces protubérances qui s'impriment lorsque l'outil est roulé sur l'argile, et l'empreinte se présente sous la forme d'une surface marquée de centaines de petites dépressions.

L'usage d'une roulette constituée d'un épi de mil est attesté au nord de la Guinée (Corbeil 1946), au centre du Burkina Faso (Zouré 2000 ; Livingstone Smith, observ. pers.), au centre-sud du Niger (Gosselain, observ. pers.), et au centre du Nigeria (Virot 2005). L'emploi d'un tel outil semble marginal et se combine toujours à celui d'autres catégories de roulettes.

Sorghum cob (*Sorghum bicolor*)
Virot (2005) mentions the use of a roulette made of the central vein of an ear of sorghum among the Gwari of Tatiko, in Nigeria.

Inflorescence of plantain banana trees (*Musa* sp.)
The end of the floral bud of plantain trees, which features staggered protrusions, is also used as a roulette. A length is trimmed off, which may be further carved lengthways. Occurrences remain very limited: north-west Cameroon (Argenti 1999; Forni 2007) and south-central Niger (Gosselain, pers. obs.).

Unmodified objects

Shells

Characteristics and distribution
Although impractical to roll given their conical shape, *Tympanotomus fuscatus* shells are used as roulettes among the Joola Kasa and some Soocé in Senegal (Sall 2005, 110–111, 118–119). The spikes covering the outside of the shell create a decoration made of irregularly-distributed dots.

Manufactured objects

Characteristics and distribution
The re-use of manufactured cylindrical objects, such as hair curlers and bicycle springs, offers new decorative possibilities to artisans. These kinds of object are often valued for their longevity and modern character. As Traoré (1985, unpaginated) remarks on the subject of Katiola potters in the northern part of the Ivory Coast, *"aux galets, bâtonnets, chiffons, fibres végétales d'hier, s'ajoutent aujourd'hui des pièces de monnaie, des roulements de voiture, des morceaux de filet de pêche ou tout autre objet qui peut s'imprimer"*. The nature of these objects make up a highly diverse group, and as such produce a wide range of patterns which we cannot fully consider here.

Of all of the manufactured objects which have been documented in the field in use as roulettes, we especially note the spring, which is very common in Burkina Faso (Some 1990; Gallay *et al.* 1998 Kientega 1988; Morin 2008; Martinelli 2010; Livingstone Smith, pers. obs.), and also observed in northern Ivory Coast (Lhote 1977), and the hair curler, used in southern Benin and southern Cameroon (Gosselain, pers. obs.). These two types of object commonly replace other roulettes, or are added to the more traditional repertoire of fibre or wooden roulettes.

Epi de sorgho *Sorghum bicolor*
Virot (2005) signale l'utilisation d'une roulette constituée de la nervure centrale d'un épi de sorgho chez les Gwari de Tatiko, au Nigeria.

Inflorescence de bananier plantain (*Musa* sp.)
La partie utilisée est l'extrémité du bourgeon floral, pourvue de protubérances disposées en quinconce. On en sectionne un tronçon, qui peut éventuellement être retaillé longitudinalement.

Les occurrences restent très limitées : nord-ouest du Cameroun (Argenti 1999 ; Forni 2007) et centre-sud du Niger (Gosselain, observ. pers.).

Roulettes constituées de matériaux non-modifiés

Coquillages

Caractéristiques et distribution
Quoique peu pratique à rouler en raison de sa forme conique, la coquille du *Tympanotomus fuscatus* est utilisée comme roulette chez les Joola Kasa et certains Soocé du Sénégal (Sall 2005, 110–111, 118–119). Les pointes qui couvrent l'extérieur de la coquille permettent d'obtenir un décor en pointillé dont la distribution est irrégulière.

Objets récupérés

Caractéristiques et distribution
Des objets manufacturés cylindriques, tels que des bigoudis ou des ressorts de vélos, offrent aux artisans de nouvelles possibilités ornementales. Ce type d'objet est souvent prisé pour sa longévité et son caractère moderne. Comme le remarque Traoré (1985, non paginé) au sujet des potières de Katiola, au nord de la Côte d'Ivoire, « aux galets, bâtonnets, chiffons, fibres végétales d'hier, s'ajoutent aujourd'hui des pièces de monnaie, des roulements de voiture, des morceaux de filet de pêche ou tout autre objet qui peut s'imprimer. » La nature de ces objets, très variable, engendre une large palette de motifs, dont il est impossible de rendre compte ici.

De tous les objets manufacturés dont l'usage comme roulette a été documenté sur le terrain, on mentionnera tout particulièrement le ressort, très courant au Burkina Faso (Some 1990; Gallay *et al.* 1998 Kientega 1988; Morin 2008; Martinelli 2010; Livingstone Smith, observ. pers.), mais également observé au Sénégal (Guèye 1998) ou au nord de la Côte d'Ivoire (Lhote 1977), ainsi que le bigoudi, utilisé au sud du Bénin et au sud du Cameroun (Gosselain, observ. pers.). Ces deux catégories d'objets se substituent à d'autres roulettes ou viennent enrichir le répertoire plus ancien de roulettes en fibres ou en bois.

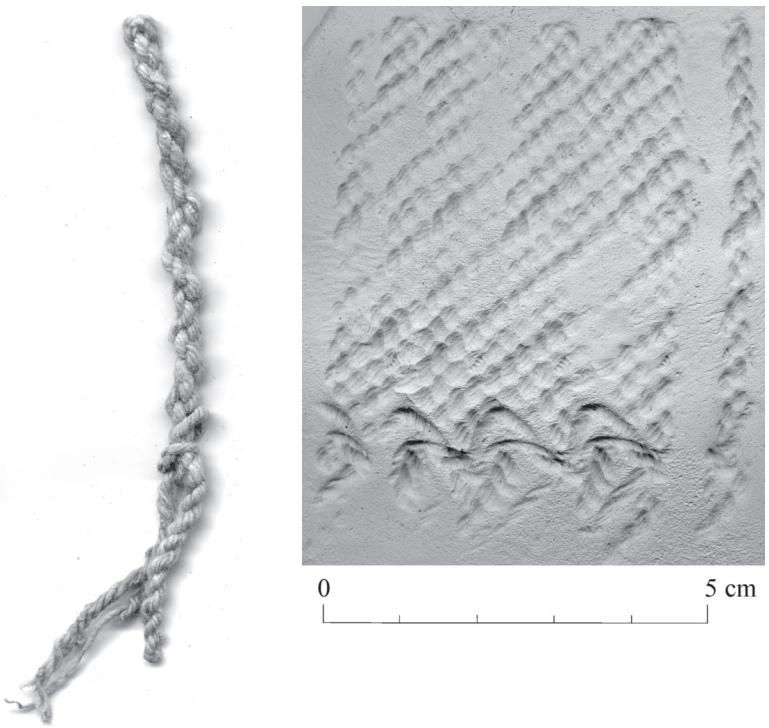

Figure 1.1. Double-twisted cord roulette: tool and impression (Tem, Togo, A. Livingstone Smith). The two zig-zag lines at the bottom of the impression were made by the knot on this roulette; see Arazi and Manning, Section 3.

Figure 1.1. Cordelette à torsade double : outil et empreinte (Tem, Togo, A. Livingstone Smith). Les deux sillons en zig zag au bas de l'empreinte sont créés par le nœud dans la roulette ; voir à ce sujet Arazi et Manning, Section 3.

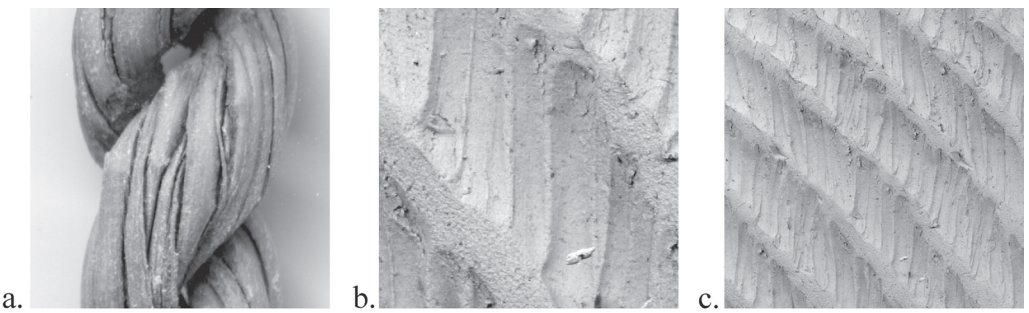

Figure 1.2. Simple twisted cord roulette (Bassa, Cameroon, O. Gosselain). The elements of this tool do not have lateral limits and the impression is continuous (there are no beads). This suggestion of continuity is reinforced if the fibres used are very fine. One cannot distinguish the beads (resulting from the cord strands) as can be done with a double-twisted cord. Fibre imprints are parallel to the axis of the tool (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.2. Cordelette à torsade simple (Bassa, Cameroun, O. Gosselain). Les éléments de l'outil n'ont pas de limite latérale et l'empreinte est continue (il n'y a pas de torons). Cette impression de continuité est renforcée si les fibres utilisées sont très fines. On ne distingue pas de torons de cordelette comme c'est le cas avec une cordelette à torsade double. Les empreintes de fibres sont parallèles à l'axe de l'outil (échelle: a et b, 1×1 cm; c. 3×3 cm).

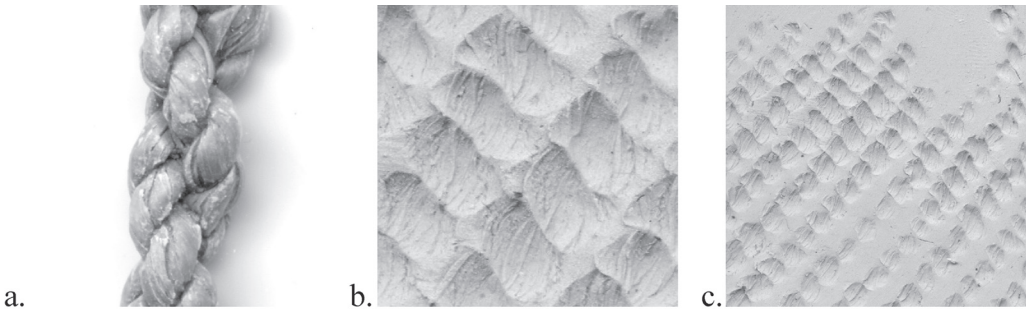

Figure 1.3. Double-twisted cord roulette (Longmo, Cameroon, A. Livingstone Smith). The elements of this tool are clearly delimited and the impression is discontinuous – one can distinguish the beads resulting from the strands of the cord. The fibre impressions are diagonal with respect to the long axis of the bead (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.3. Cordelette à torsade double (Longmo, Cameroun, A. Livingstone Smith). Les éléments de l'outil sont bien délimités et l'empreinte est discontinue – on distingue les torons de la cordelette. Les empreintes de fibres sont diagonales par rapport au grand axe du toron (échelle: a et b, 1×1 cm; c. 3×3 cm).

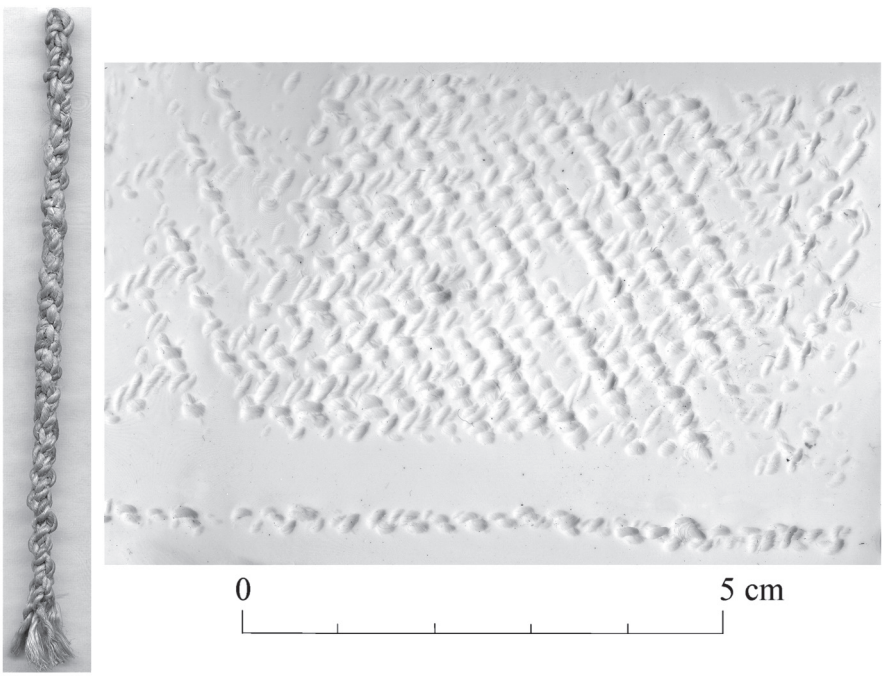

Figure 1.4. Braided cord roulette: tool and impression (Somono, Mali, A. Mayor). This roulette is composed of two simple twisted fibre cords folded over to obtain four strands. These are braided by alternately folding one strand over another, then knotted at the end with a cotton thread. See Figure 1.5 for the detail.

Figure 1.4. Cordelette tressée : outil et empreinte (Somono, Mali, A. Mayor). Cette roulette est constituée de deux cordelettes à torsade simple, repliées sur elles-mêmes pour obtenir quatre brins. Le tressage consiste à replier alternativement un brin sur l'autre, puis à nouer l'extrémité de l'outil à l'aide d'un fin fil de coton. Voir Figure 1.5 pour le détail.

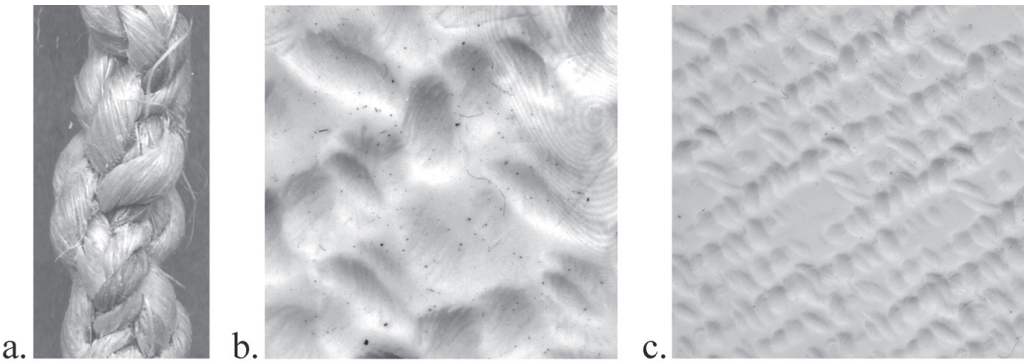

Figure 1.5. Braided cord roulette: detail of the tool and of its impression (Somono, Mali, A. Mayor). The impression is discontinuous as it is made up of a series of cord impressions in a chevron pattern (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.5. Cordelette tressée : détail de l'outil et de son empreinte (Somono, Mali, A. Mayor). Le motif imprimé est discontinu, car il est constitué de séries d'empreintes de segments de corde en chevrons (échelle: a et b, 1×1 cm; c. 3×3 cm).

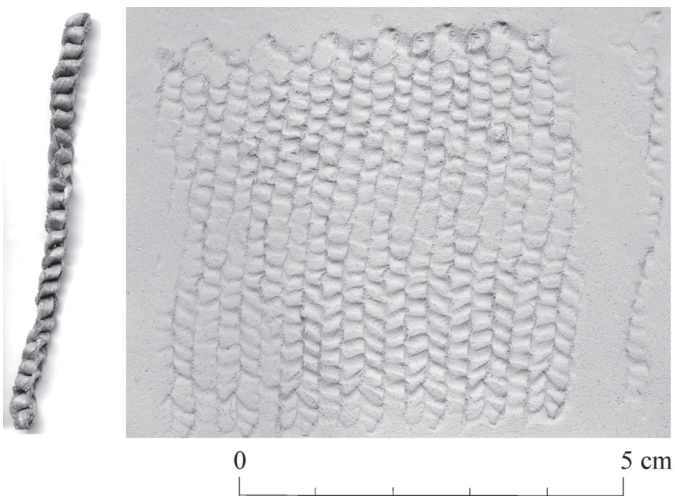

Figure 1.6. One-fibre folded strip roulette: tool and impression (Dowayo, Cameroon, A. Livingstone Smith, O. Gosselain). See Figure 1.9 for the detail, as well as Figure 2.4 for an analytical approach to the impression.

Figure 1.6. Fibre plate pliée à un brin : outil et empreinte (Dowayo, Cameroun, A. Livingstone Smith, O. Gosselain). Voir Figure 1.9 pour le détail, ainsi que Figure 2.4 pour l'approche analytique de l'empreinte.

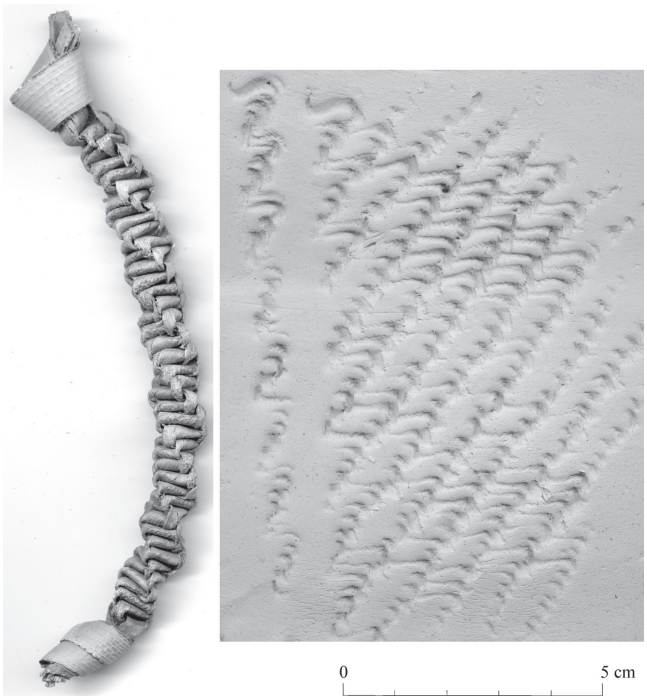

Figure 1.7. Two-fibre folded strip roulette: tool and impression (Serer, Senegal, M. Sall). See Figure 1.10 for the detail.

Figure 1.7. Fibre plate pliée à deux brins : outil et empreinte (Serer, Sénégal, M. Sall). Voir Figure 1.10 pour le détail.

Figure 1.8. One-fibre folded strip roulette: detail of the tool and of its impression (Dowayo, Cameroon, A. Livingstone Smith, O. Gosselain). The active part of the tool is not rectangular, but parallelipedal, due to the twisting that occurs during folding. The impressed elements are in the shape of a rectangle with a concave top and convex base (resembling a horizontal Z). The upper left and lower right corners of the rectangle appear to connect to adjacent impressed elements. Since the tool is straight, the organisation of the impressed elements is vertical (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.8. Fibre plate pliée à un brin : détail de l'outil et de l'empreinte (Dowayo, Cameroun, A. Livingstone Smith, O. Gosselain). La partie agissante de l'outil n'est pas rectangulaire, mais parallélépipédique, en raison de la torsion qui accompagne le pliage. Les éléments imprimés présentent la forme d'un rectangle dont le sommet est concave et la base convexe (apparence d'un 'Z' couché). Le coin supérieur gauche et inférieur droit du rectangle semble rejoindre les éléments imprimés voisins. Comme l'outil est droit, l'agencement des éléments imprimés est vertical (échelle: a et b, 1×1 cm; c. 3×3 cm).

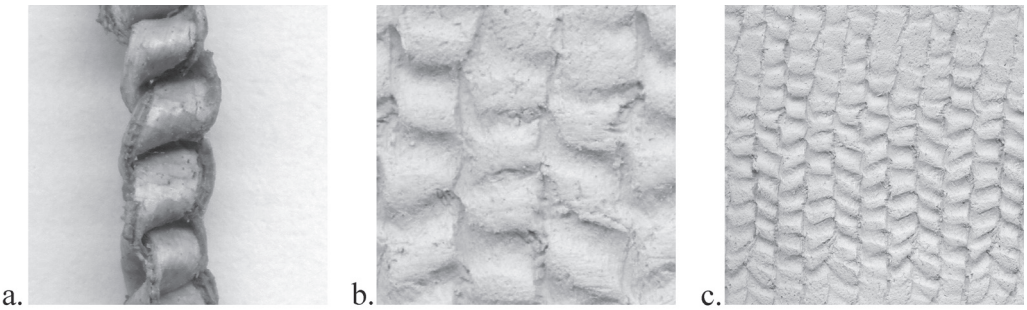

Figure 1.9. One-fibre folded strip roulette: detail of the tool and of its impression (Dowayo, Cameroon, A. Livingstone Smith, O. Gosselain). This tool is smaller than that in the the previous figure. Here the parallelipedal impressed elements are asymmetrically deformed to the right and left, due to the twisting of the fibres during folding. This tool is straight and the organisation of the impressed elements is vertical (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.9. Fibre plate pliée à un brin : détail de l'outil et de l'empreinte (Dowayo, Cameroun, A. Livingstone Smith, O. Gosselain). L'outil est plus petit que le précédent. Ici, les parallélépipèdes sont déformés de manière asymétrique à droite et à gauche en raison de la torsion des fibres lors du pliage. Cet outil est droit et l'agencement des éléments imprimés est vertical (échelle: a et b, 1×1 cm; c. 3×3 cm).

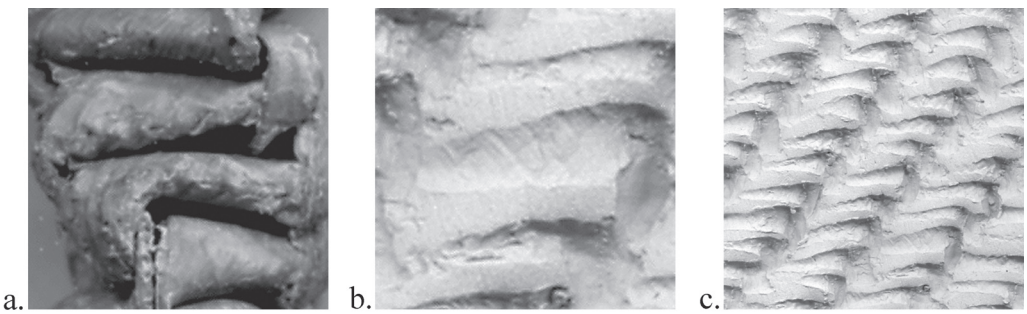

Figure 1.10. Two-fibre folded strip roulette: detail of the tool and of its impression (Serer, Senegal, M. Sall). This tool is much larger than the preceding ones and the fibres are tighter. The deformation observed in the other examples is more marked. The impressed elements have a shape which clearly recalls a horizontal Z or S. The tool has a spiral configuration and the organisation of the impressed elements is diagonal (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.10. Fibre plate pliée à deux brins : détail de l'outil et de l'empreinte (Serer, Sénégal, M. Sall). L'outil est beaucoup plus grand que les précédents et les fibres sont plus serrées. La déformation observée dans les exemples précédents est plus marquée. Les éléments imprimés ont clairement la forme d'un 'Z' ou d'un 'S' couché. L'outil est spiralé et l'agencement des éléments imprimés est diagonal (échelle: a et b, 1×1 cm; c. 3×3 cm).

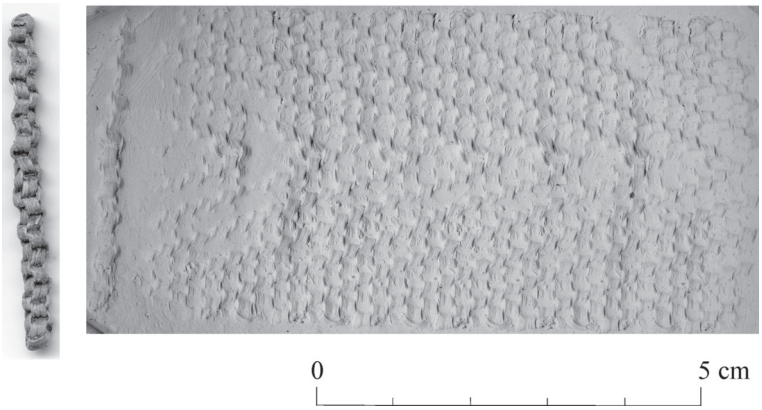

Figure 1.11. One-fibre knotted strip roulette: tool and impression (Mambila, Cameroon, O. Gosselain). See Figure 1.14 for detail, and Figure 2.3 for an analytical approach.

Figure 1.11. Fibre plate nouée à un brin : outil et empreinte (Mambila, Cameroun, O. Gosselain). Voir Figure 1.14 pour le détail, et Figure 2.3 pour une approche analytique.

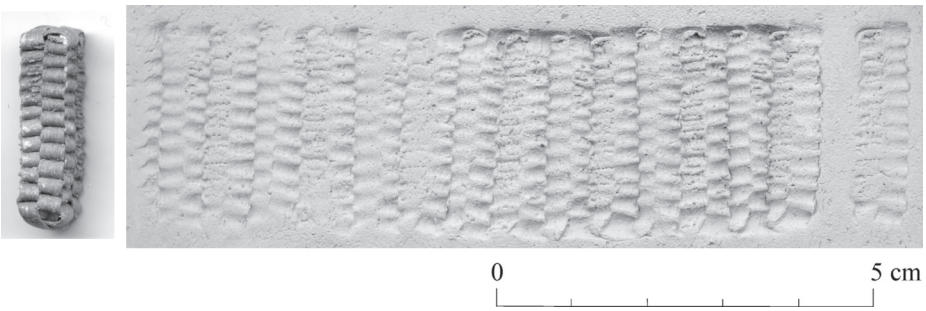

Figure 1.12. Two-fibre knotted strip roulette: tool and impression (Gbaya, Cameroon, O. Gosselain). See Figure 1.15 for detail.

Figure 1.12. Fibre plate nouée à deux brins : outil et empreinte (Gbaya, Cameroun, O. Gosselain). Voir Figure 1.15 pour le détail.

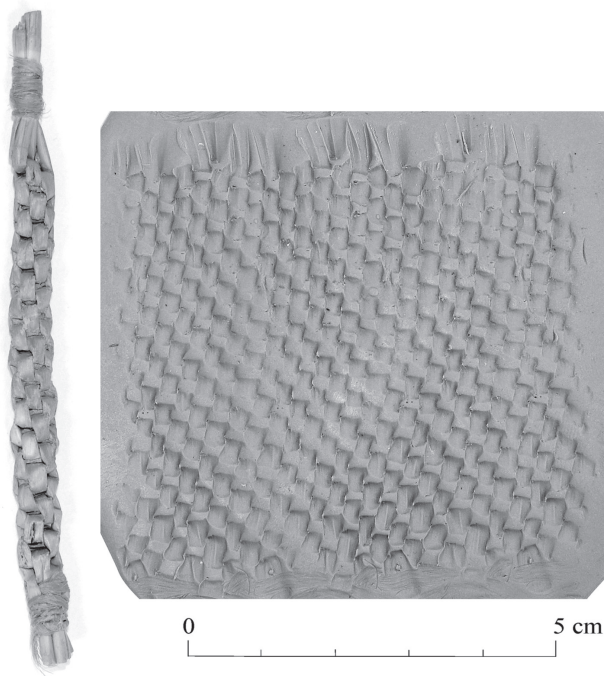

Figure 1.13. Four-fibre knotted strip roulette: tool and impressions (British Museum, [1946 Af 18.181]). See Figure 1.16 for detail. Photo by Julie Hudson, reproduced by kind permission of the Trustees of the British Museum.

Figure 1.13. Fibre plate nouée à quatre brins : outil et empreinte (British Museum, [1946 Af 18.181]). Voir Figure 1.16 pour le détail. Photo par Julie Hudson, reproduite avec l'aimable permission des Trustees du British Museum.

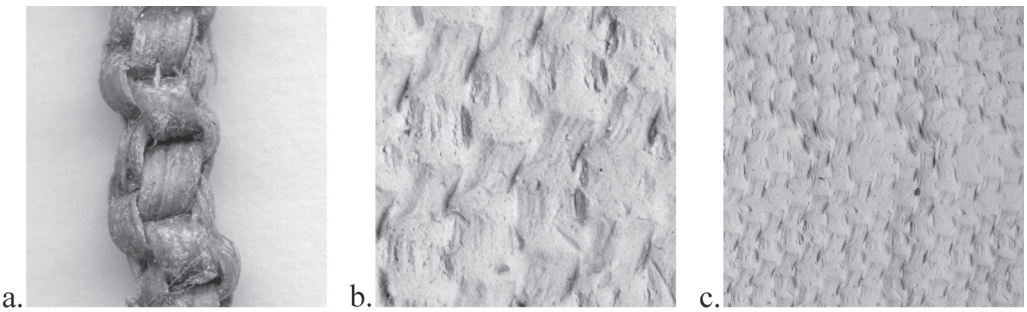

Figure 1.14. One-fibre knotted strip roulette: detail of the tool and of its impression (Mambila, Cameroon, O. Gosselain). The impression consists of square to rectangular elements. The tool is worn and the delimitation of elements is sometimes blurred. Furthermore, one can distinguish the fibrous character of the material used (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.14. Fibre plate nouée à un brin : détail de l'outil et de l'empreinte (Mambila, Cameroun, O. Gosselain). L'empreinte est constituée d'élements carrés à rectangulaires. L'outil est usé et la limite entre les éléments est parfois estompée. On distingue par ailleurs le caractère fibreux du matériau utilisé (échelle: a et b, 1×1 cm; c, 3×3 cm).

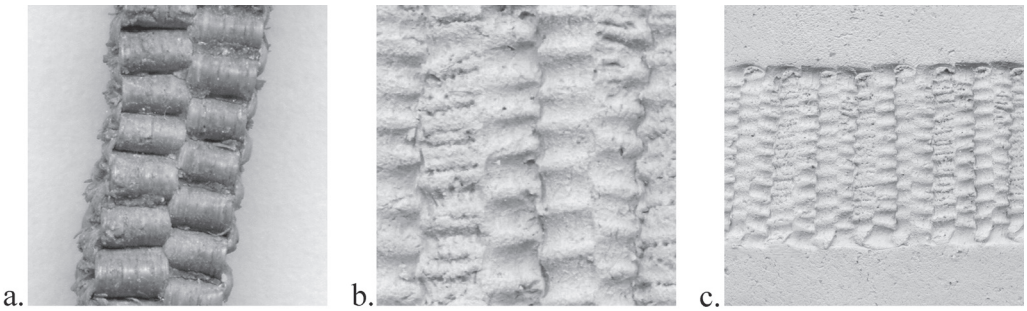

Figure 1.15. Two-fibre knotted strip roulette: detail of the tool and of its impression (Gbaya, Cameroon, O. Gosselain) (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.15. Fibre plate nouée à deux brins : détail de l'outil et de l'empreinte (Gbaya, Cameroun, O. Gosselain) (échelle: a et b, 1×1 cm; c. 3×3 cm).

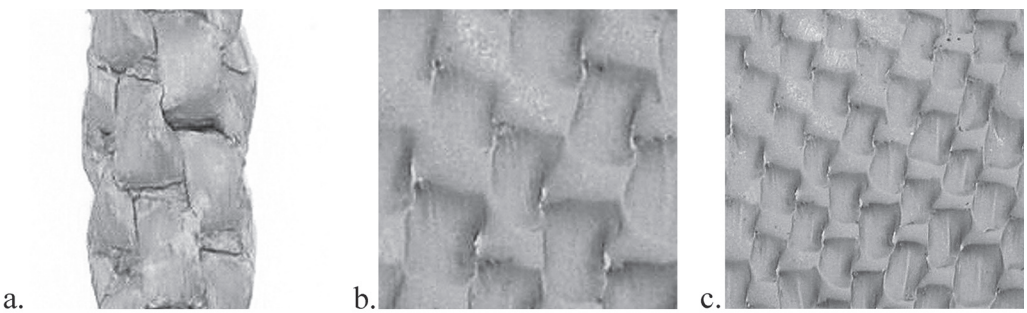

Figure 1.16. Four-fibre knotted strip roulette: detail of the tool and of its impression (British Museum, [1946 Af 18.181]) (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.16. Fibre plate nouée à quatre brins : détail de l'outil et de l'empreinte (British Museum, [1946 Af 18.181]) (échelle: a et b, 1×1 cm; c. 3×3 cm).

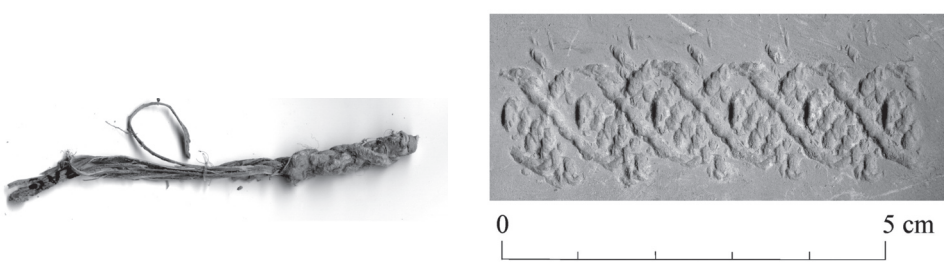

Figure 1.17. Cord-wrapped roulette on a continuous core: tool and impression (Mossi, Burkina Faso, A. Livingstone Smith). The extremity of one of the strands is passed over the top and wrapped around the twisted cord, which in this case has a double twist.

Figure 1.17. Cordelette enroulée sur âme continue: outil et empreinte (Mossi, Burkina Faso, A. Livingstone Smith). L'extrémité de l'un des brins est rabattue vers le haut et enroulée sur la cordelette, qui dans cet example a une double torsion.

Figure 1.18. Cord-wrapped roulette on a continuous core (northern Nigeria): tool and impression. This roulette is about 5 cm long. British Museum [1927.12.8–11]. Photo by Julie Hudson, reproduced by kind permission of the Trustees of the British Museum.

Figure 1.18. Cordelette enroulée sur âme continue (nord du Nigeria) : outil et impression. Cette roulette mesure environ 5 cm de long. British Museum [1927.12.8–11]. Photo par Julie Hudson, reproduite avec l'aimable permission des Trustees du British Museum.

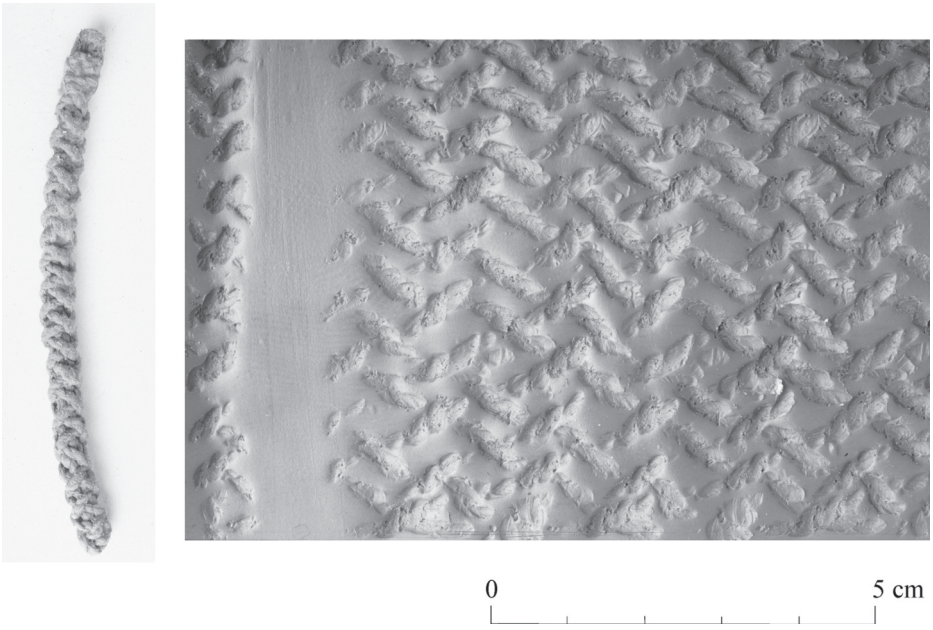

Figure 1.19. Braided cord roulette on a continuous core: tool and impression (Somono, Mali, A. Mayor). See Figure 1.20 for detail.

Figure 1.19. Cordelette tressée sur âme continue: outil et impression (Somono, Mali, A. Mayor). Voir Figure 1.20 pour le détail.

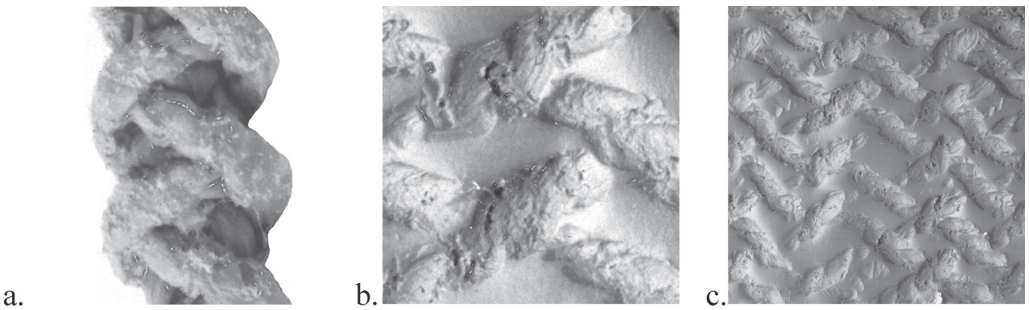

Figure 1.20. Braided cord roulette on a continuous core: detail of the tool and of its impression (Somono, Mali, A. Mayor). The impressed motif is discontinuous and made up of impressions of cord segments in a chevron pattern. The chevrons are more widely spaced than in the case of a simple braided cord roulette (see Figures 1.4 and 1.5). This is due to the fact that the cord is folded over itself and the impressed segments are supported by a core (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.20. Cordelette tressée sur âme continue : détail de l'outil et de l'empreinte (Somono, Mali, A. Mayor). Le motif imprimé est discontinu et constitué d'empreintes de segments de corde en chevrons. Les chevrons sont plus espacés que dans le cas de la roulette simple de cordelette tressée (voir Figures 1.4 et 1.5). L'écart en question tient au fait que la cordelette est repliée sur elle-même et les segments imprimés sont soutenus par une âme (échelle: a et b, 1×1 cm; c. 3×3 cm).

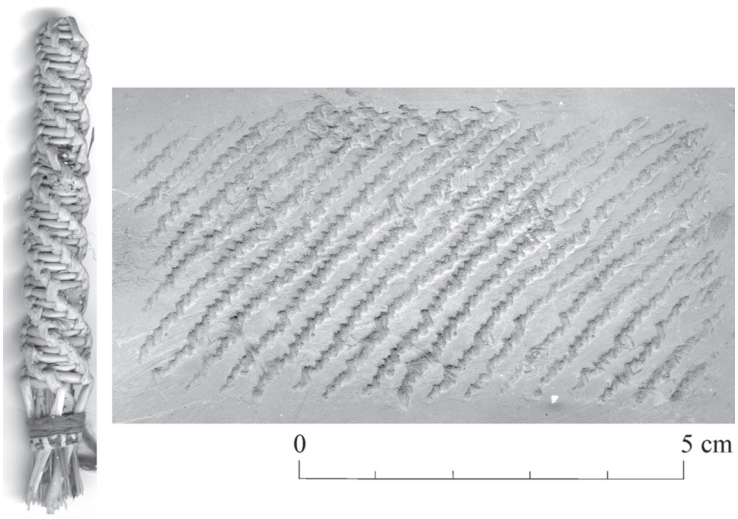

Figure 1.21. Braided strip roulette on a continuous core: tool and impression (Gouin, Burkina Faso, A. Livingstone Smith).

Figure 1.21. Fibres plates tressées sur âme continue : outil et empreinte (Gouin, Burkina Faso, A. Livingstone Smith).

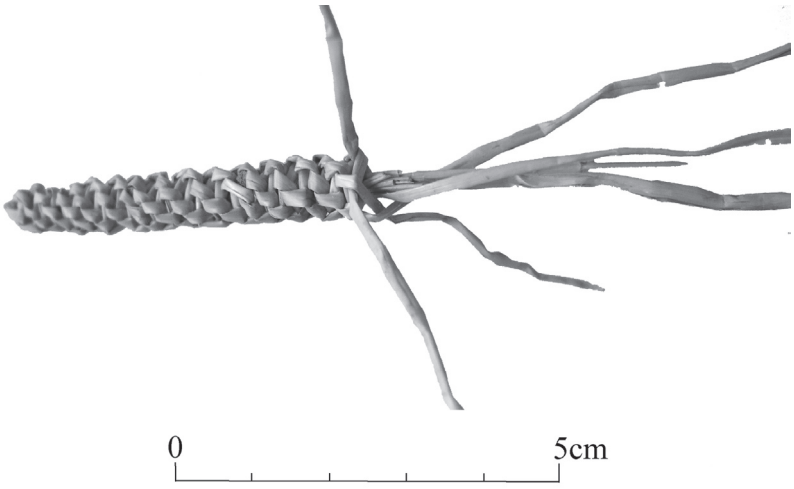

Figure 1.22. Braided strip roulette (Bwa, Mali, A. Mayor). Illustration of the technique used in braiding five strands on a continuous core.

Figure 1.22. Fibres plates tressées (Bwa, Mali, A. Mayor). Vue de la technique de tressage des cinq brins de paille sur âme continue.

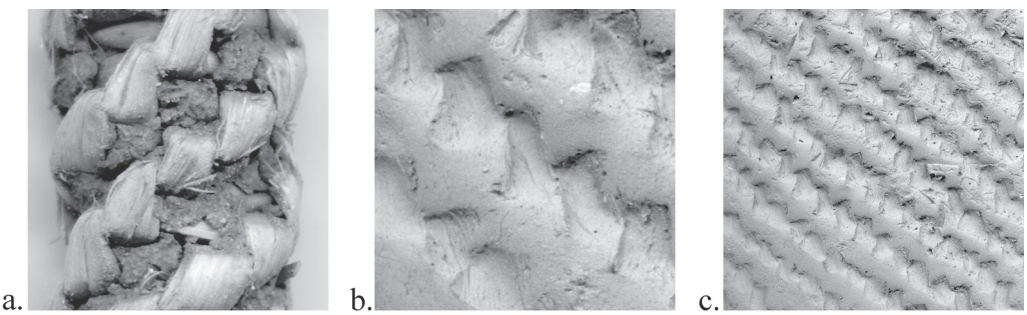

Figure 1.23. Braided strip roulette on a continuous core: detail of the tool and of its impression (Kabye, Togo, A. Livingstone Smith). The tool is slightly worn and clogged, but the units of impression remain visible (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.23. Fibres plates tressées sur âme continue : détail de l'outil et de l'empreinte (Kabye, Togo, A. Livingstone Smith). L'outil est légèrement usé et encrassé, mais les unités d'impression restent visibles (échelle: a et b, 1×1 cm; c. 3×3 cm).

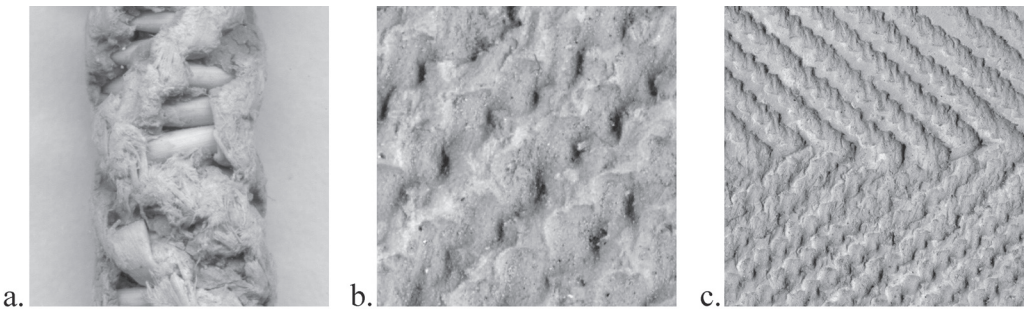

Figure 1.24. Alternately-braided strip roulette on a continuous core: detail of the tool and of its impression (Karaboro, Togo, A. Livingstone Smith). This tool is very worn and the units of impression are difficult to recognise (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.24. Fibres plates tressées alternes sur âme continue : détail de l'outil et de l'empreinte (Karaboro, Togo, A. Livingstone Smith). L'outil est fort usé et les unités d'impression sont difficilement reconnaissables (échelle: a et b, 1×1 cm; c. 3×3 cm).

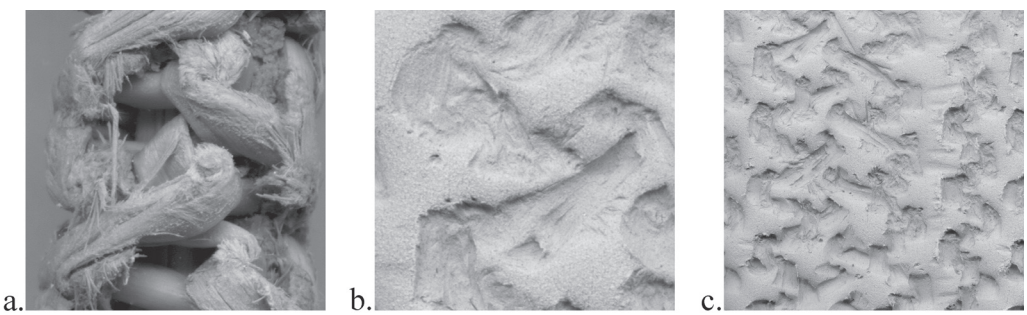

Figure 1.25. Cross-braided strip roulette on a continuous core: detail of the tool and of its impression (Dyoula, Burkina Faso, A. Livingstone Smith). This tool presents an anomaly in the form of a long diagonal in some places in the cycle of repetitions. The part of the tool which is responsible for this anomaly is visible in image a (scale: a and b, 1×1 cm; c, 3×3 cm). See also Figure 2.5. for an analytical approach.

Figure 1.25. Fibres plates tressées croisées sur âme continue : détail de l'outil et de l'empreinte (Dyoula, Burkina Faso, A. Livingstone Smith). Cet outil présente une 'anomalie' sous la forme d'une longue diagonale en certains endroits du cycle d'impression. La zone de l'outil responsable de cette anomalie est visible sur la photo en a (échelle: a et b, 1×1 cm; c. 3×3 cm). Voir aussi Figure 2.5 pour une approche analytique.

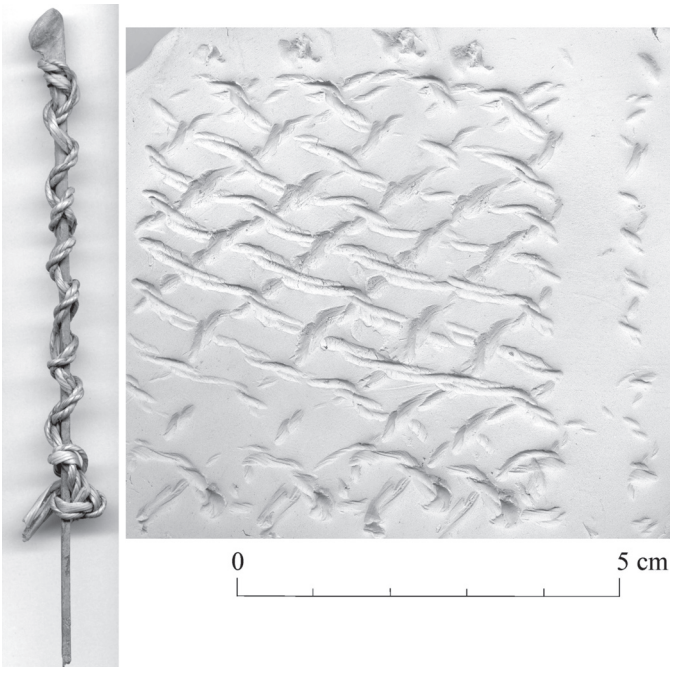

Figure 1.26. Counter-wrapped cord roulette on an independent bone core: tool and impression (Moba, Togo, A. Livingstone Smith). See Figure 1.28 for the detail.

Figure 1.26. Fibres croisées sur âme indépendante en os : outil et empreinte (Moba, Togo, A. Livingstone Smith. Voir Figure 1.28 pour le détail.

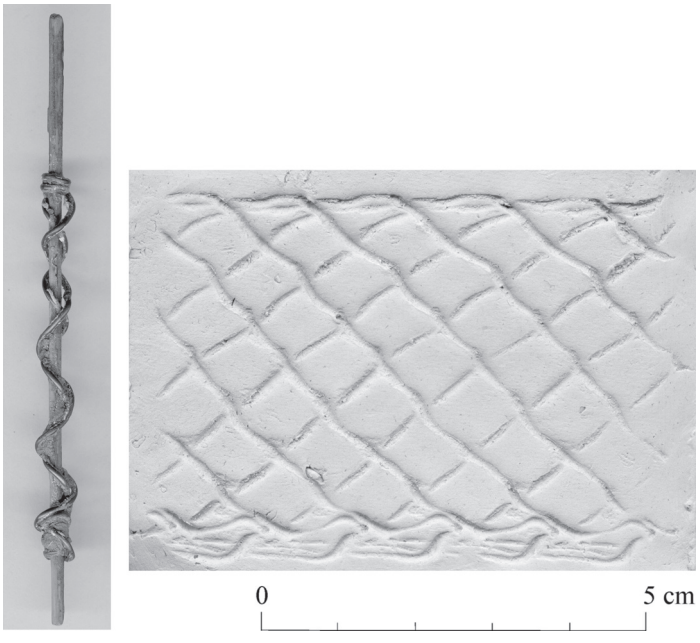

Figure 1.27. Counter-wrapped copper wire roulette on an independent iron core: tool and impression (Gobirawa Hausa, Niger, O. Gosselain).

Figure 1.27. Fil de cuivre croisé sur âme indépendante en fer: outil et empreinte (Hausa Gobirawa, Niger, O. Gosselain).

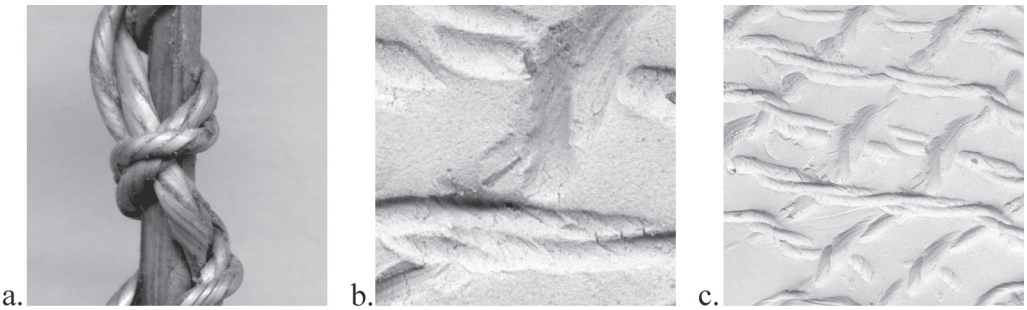

Figure 1.28. Counter-wrapped cord roulette on an independent core: detail of the tool and of its impression (Moba, Togo, A. Livingstone Smith). The impression shows a crossing motif which can be confused with that of a knotless net. In this case, the fibres are juxtaposed as they cross, which differentiates this type of tool from a net. Compare to Figure 1.31. (scale: a and b, 1×1 cm; c. 3×3 cm).

Figure 1.28. Cordelette croisée sur âme indépendante : détail de l'outil et de l'empreinte (Moba, Togo, A. Livingstone Smith). L'empreinte présente un motif croisé qui peut se confondre avec l'impression d'un filet sans nœuds. Dans le cas présent, le croisement des fibres se fait par juxtaposition, ce qui différencie ce type d'outil des filets. Comparer à la Figure 1.31. (échelle: a et b, 1×1 cm; c. 3×3 cm).

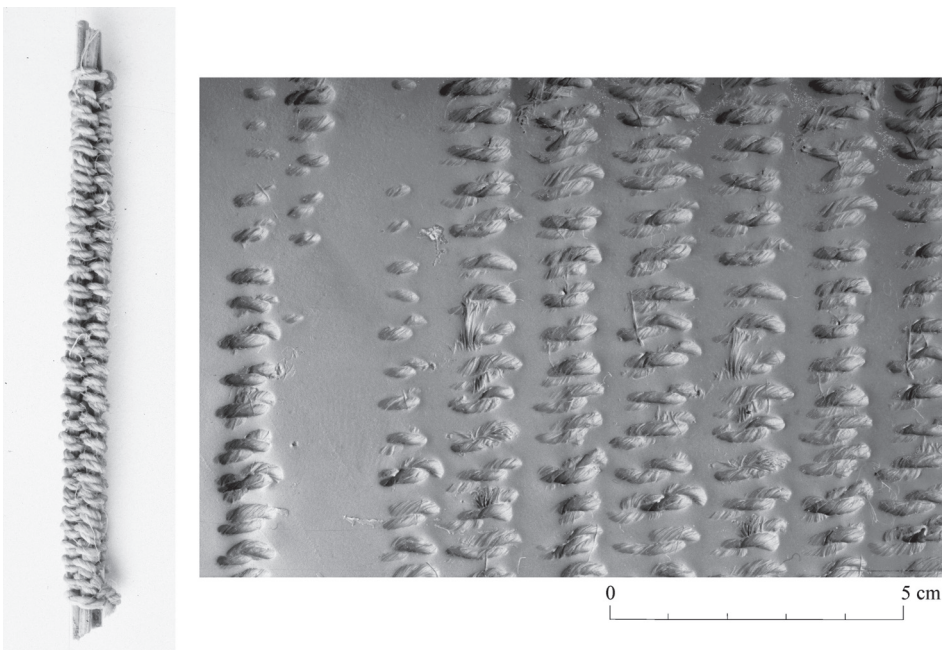

Figure 1.29. Cord-wrapped roulette on multiple independent wood cores: tool and impression (Tupuri, Cameroon, O. Langlois). See Figure 1.31 for detail.

Figure 1.29. Cordelette sur âme indépendante multiple en bois : outil et empreinte (Tupuri, Cameroun, O. Langlois). Voir Figure 1.31 pour le détail.

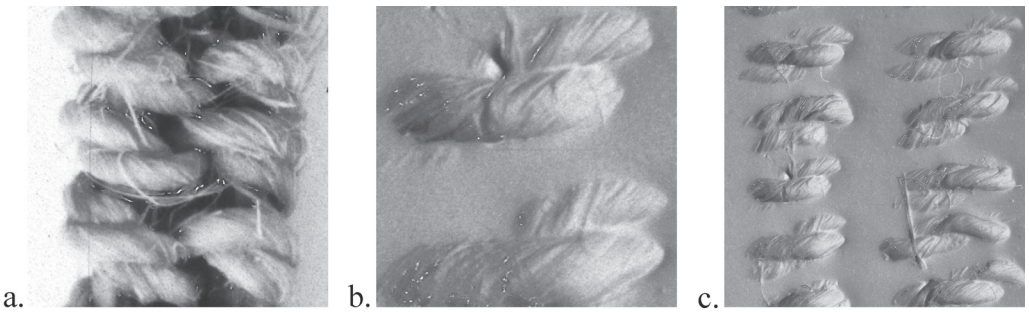

Figure 1.30. Cord-wrapped roulette on multiple independent cores: detail of the tool and of its impression (Tupuri, Cameroon, O. Langlois). The impressions appear as vertical rows of cord impressions, each separated by an empty area. This pattern can be confused with direct mat impressions (see Figures 1.34 and 1.35). However, in the case of the latter, the empty area is less marked (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.30. Cordelette sur âme indépendante multiple : détail de l'outil et de l'empreinte (Tupuri, Cameroun, O. Langlois). Les impressions apparaissent comme des rangées verticales d'empreintes de cordelettes. Chaque rangée est séparée de la suivante par une plage réservée. Ces impressions peuvent se confondre avec des impressions directes de vannerie (voir Figures 1.34 et 1.35). La plage réservée est moins apparente dans le cas de la vannerie (échelle: a et b, 1×1 cm; c. 3×3 cm).

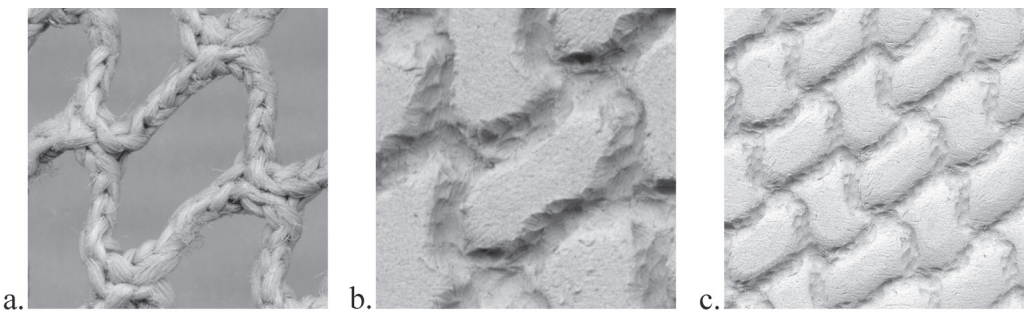

Figure 1.31. Net: detail of the cordage and of its impression (Bambara, Mali, O. Gosselain). The net is wrapped around a cobble, which is also used to shape the body of vessels. The single impression of the net through beating produces a grid pattern – the sinuous lines are knotted at each junction. Here, each cord impression seems to meander and the beads can be clearly distinguished (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.31. Filet : détail du cordage et de l'empreinte (Bambara, Mali, O. Gosselain). Le filet est enroulé sur un galet, aussi utilisé pour mettre en forme la panse des récipients. L'impression simple du filet par battage produit un motif en croisillon – les lignes sinueuses sont nouées à chaque croisement. Chaque empreinte de cordelette semble serpenter et on en distingue clairement les torons (échelle: a et b, 1×1 cm; c. 3×3 cm).

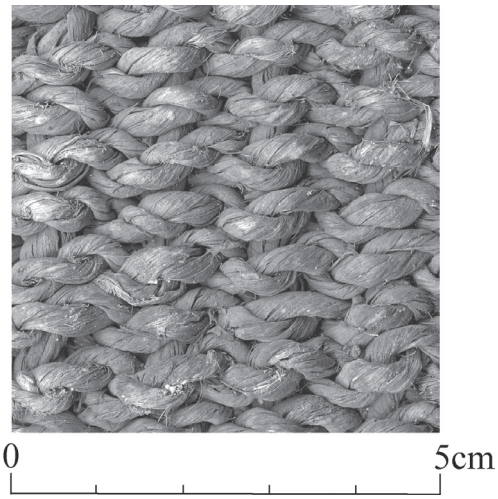

Figure 1.32. Straight mat with corded strands (Dogon, Mali, A. Mayor). See Figure 1.34 for detail.

Figure 1.32. Vannerie droite à brins cordés (Dogon, Mali, A. Mayor). Voir Figure 1.34 pour le détail.

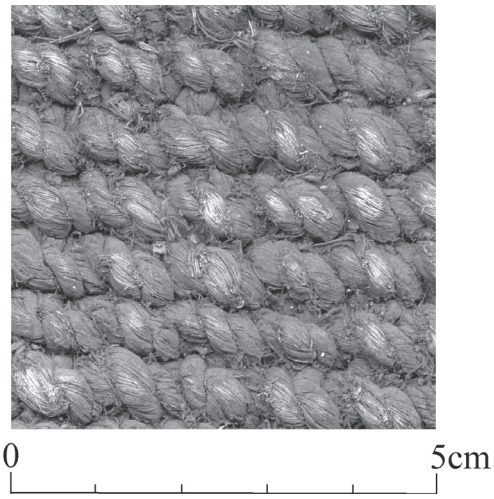

Figure 1.33. Straight mat with corded strands (Dogon, Gologou, Mali, D. Keita). See Figure 1.35 for detail.

Figure 1.33. Vannerie droite à brins cordés (Dogon, Gologou, Mali, D. Keita). Voir Figure 1.35 pour le détail.

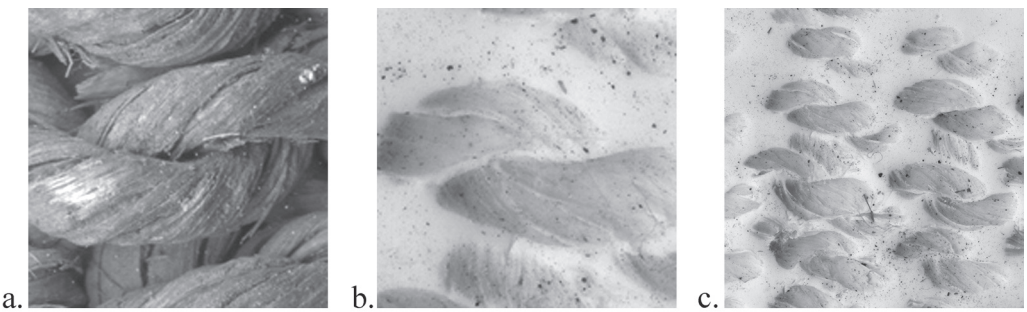

Figure 1.34. Straight mat with corded strands: detail of the cords and of their impression (Dogon, Gologou, Mali, A. Mayor). This type of mat is used as a support during the rough shaping of vessels using the pounding on a concave form method. As in the case of roulettes with several cores, the impressions appear as vertical columns of cord impressions, where each column is separated from the next by an empty zone. Unlike roulettes, however, there is no cycle of repetition (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.34. Vannerie droite à brins cordés : détail du cordage et de l'empreinte (Dogon, Gologou, Mali, A. Mayor). Ce type de natte est utilisé comme support lors de l'ébauchage des récipients par martelage sur forme concave. Comme pour les roulettes sur âmes multiples, les empreintes prennent la forme de rangées verticales d'impressions de cordelettes et chacune d'elles est séparée de la suivante par une plage réservée. A la différence des roulettes, cependant, il n'y a pas de cycle de répétition (échelle: a et b, 1×1 cm; c. 3×3 cm).

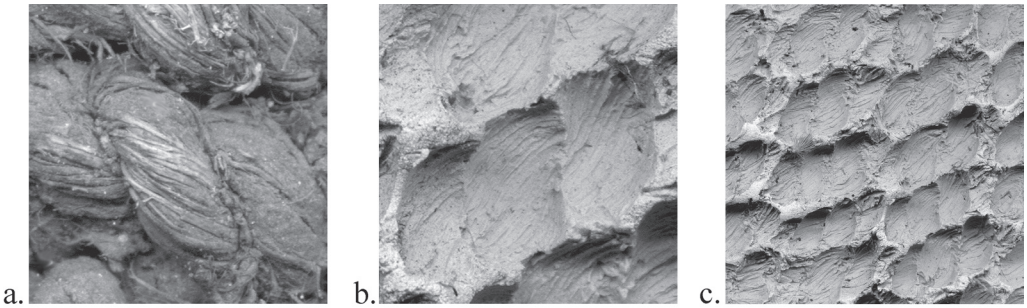

Figure 1.35. Straight mat with corded strands: detail of the cords and of their impression (Dogon, Gologou, Mali, D. Keita). This type of mat is used as a support during the rough shaping of vessels using the pounding on a concave form method. Impressions again appear as vertical columns of cord impressions, but each row is closely entwined into the next. There is no cycle of repetition (scale: a and b, 1×1 cm; c, 3×3 cm).

Figure 1.35. Vannerie droite à brins cordés : détail du cordage et de l'empreinte (Dogon, Gologou, Mali, D. Keita). Ce type de natte est utilisé comme support lors de l'ébauchage des récipients par martelage sur forme concave. A nouveau les impressions apparaissent comme des rangées verticales d'impressions de cordes, mais chaque rangée est étroitement imbriquée dans la suivante. Il n'y a pas de cycle de répétition (échelle: a et b, 1×1 cm; c. 3×3 cm).

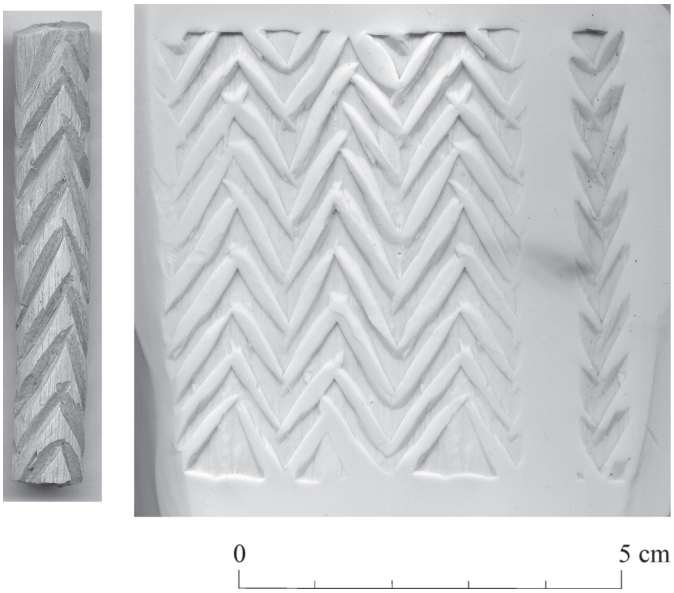

Figure 1.36. Carved wooden roulette: tool and impression (Bwa, Mali, A. Mayor).

Figure 1.36. Roulette taillée en bois : outil et empreinte (Bwa, Mali, A. Mayor).

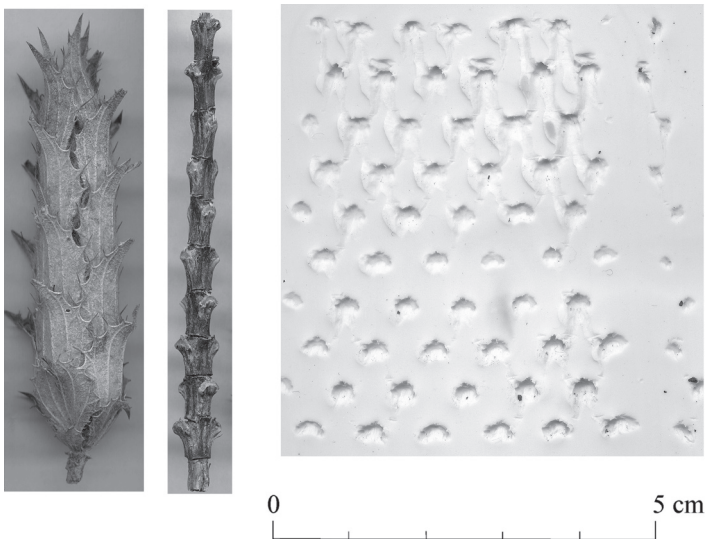

Figure 1.37. Roulette made of an ear of Blepharis ciliaris: tool and impression (Dogon, Mali, A. Mayor).

Figure 1.37. Roulette en épi taillé de blépharis ciliaris : outil et empreinte (Dogon, Mali, A. Mayor).

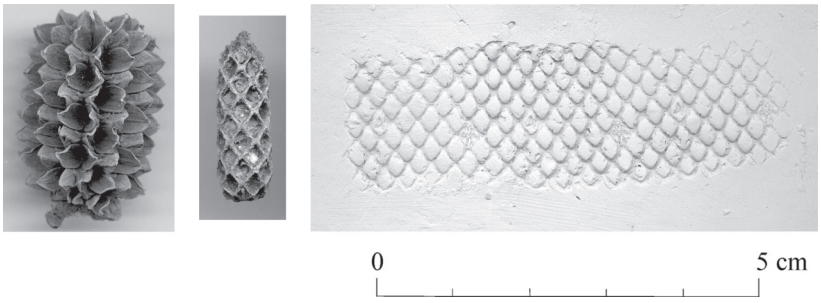

Figure 1.38. Carved Casuarina fruit roulette: tool and impression (Gurmantche, Togo, A. Livingstone Smith).

Figure 1.38. Roulette en épi taillé de Casuarina : outil et empreinte (Gurmantche, Togo, A. Livingstone Smith).

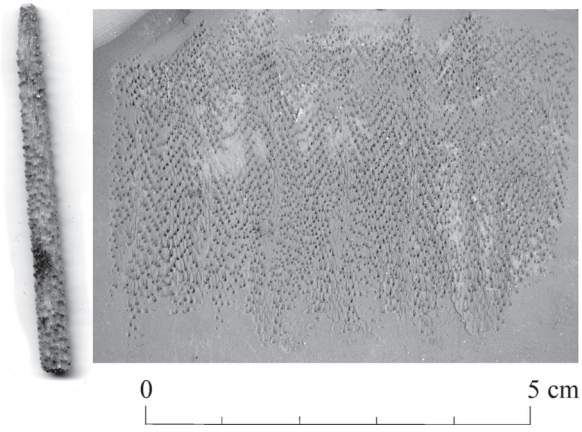

Figure 1.39. Carved millet cob roulette: tool and impression (Mossi, Burkina Faso, A. Livingstone Smith).

Figure 1.39. Roulette en épi de mil taillé : outil et empreinte (Mossi, Burkina Faso, A. Livingstone Smith).

Notes

1 These objects were collected for an exhibition during a programme of ethnoarchaeological investigation of ceramic traditions of the Inner Niger Delta of Mali carried out by the University of Geneva (Gallay *et al*. 1996).
2 These authors use the term 'twisted strip roulette'. We note that Soper (1985) does not mention the twisting involved in the making of this tool, and that Langlois (2004, 114) considers it to be aesthetic.
3 The fibre is split in two by rolling it around a finger, and knotting begins with the upper half of the fibre. Once the upper part is used up, the rough form is removed from the finger and is turned around, and the loop that was previously on the finger becomes the new point of departure (Livingstone Smith, pers. obs in Burundi).
4 This object having unfortunately disappeared since the exhibition, only photographs and plasticine impressions remain available.
5 We have few ethnographic observations regarding the manufacturing process of these tools. A. Livingstone Smith observed demonstrations using dry straw at Vy (Burkina Faso) and Nannou (Togo). In addition, A. Mayor took apart one roulette of this type, which had been collected from a Bwa caste potter from Mali during the project "Ethnoarchaeological analysis of ceramic traditions of the Inland Niger Delta, Mali" (Gallay *et al.* 1996, 1998); see Figure 1.22. These complementary data allowed us to understand the technological process by which this tool is made, and to finally obtain a reliable description and appropriate terminology.
6 Olivier Langlois (2004, 113, 116) terms this roulette 'fibres plates nouées en scoubidou cyclindrique', but it is in fact made by braiding, not by knotting.
7 See also Mayor, Section 3, this volume.
8 http://cerafim.free.fr/francais/objets/instruments/roulettes/composites.htm
9 But the tool is barely visible in the figure.
10 Example collected in 1979 in Lui (around 150 kilometres from Juba) by Patti Langton.
11 The plant has been erroneously identified as *Dicoma formentosa* (Leoni and Prichett 1978, 6) [in fact *D. Tomentosa*], a kind of thistle in the Compositae family, the inflorescence of which does not in any way resemble that illustrated by the Leoni and Pritchett (1978, 7) in their Plate 7, and which beyond a doubt shows *Blepharis* sp.

Notes

1 Ces outils ont été collectés pour une exposition dans le cadre du programme de recherche ethnoarchéologique sur la céramique du Delta intérieur du Niger mené par l'Université de Genève (Gallay *et al*. 1996).
2 Ces auteurs utilisent le terme de 'twisted strip roulette'. On notera que Soper (1985) ne fait aucune mention de la notion de torsion impliquée dans la fabrication de cet outil, et que Langlois (2004, 114) la considère comme esthétique.
3 On divise la fibre en deux en l'enroulant autour de son doigt et on commence le nouage avec la moitié supérieure de la fibre. Une fois cette partie terminée, on retourne l'ébauche et on utilise la boucle qui était enroulée autour du doigt comme nouveau point de départ (Livingstone Smith, observ. pers. au Burundi).
4 Cet objet ayant malheureusement disparu depuis l'exposition, nous n'en avons plus que des photographies et des impressions sur plasticine.
5 On dispose de peu d'observations ethnographiques de la chaîne opératoire de ces outils. A. Livingstone Smith a observé des démonstrations faites à l'aide de paille sèche à Vy (Burkina Faso) et à Nannou (Togo). Par ailleurs, A. Mayor a pris le parti de décortiquer l'une des roulettes de ce type, collectée auprès d'une potière castée bwa du Mali dans le cadre du projet "Étude ethnoarchéologique des traditions céramiques du Delta intérieur du Niger, Mali" (Gallay *et al.* 1996, 1998) ; voir Figure 1.22. Ces informations complémentaires nous ont permis de comprendre le procédé technique de fabrication de cet outil et d'obtenir enfin une description fiable et un terme approprié.
6 Olivier Langlois (2004, 113, 116) qualifie cette roulette de 'fibres plates nouées en scoubidou cylindrique', mais il s'agit bien d'une construction par tressage, sans nouage.
7 Voir aussi Mayor, Section 3, this volume.
8 http://cerafim.free.fr/francais/objets/instruments/roulettes/composites.htm
9 Mais l'outil est à peine visible sur la figure.
10 Exemplaire collecté en 1979 à Lui (à environ 150 kilomètres de Juba) par Patti Langton.
11 La plante est erronément identifiée comme *Dicoma formentosa* (Leoni et Prichett 1978, 6) [en réalité *D. Tomentosa*], une sorte de chardon de la famille des Compositae, dont l'inflorescence n'a aucune ressemblence avec celle qu'illustrent Leoni et Pritchett (1978, 7 et Planche 7), qui elle correspond sans aucun doute au *Blepharis* sp.

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SECTION 2

The extensive ethnographic overview of roulettes and their impressions outlined in Section 1, has made it clear that a great variety of materials, methods of fabrication and actions can be combined to create impressed decorations. But how can this diversity begin to be apprehended in archaeological terms? The following section presents an approach to this problem, building upon earlier descriptive methods of roulette identification, but expanding them with the help of recent developments in image processing software and the general increase in computing power available to researchers. Perhaps the most distinctive characteristic of fibre roulettes when rolled across clay is the inherent set of repetitions they leave in their impression. The analytical technique outlined in this section illustrates these traits, revealing a logical means for distinguishing between different roulette types. As such, this technique takes the identification of fibre roulettes out of the realm of 'impressions' and into that of reasoned arguments.

A method of identification for rolled impressed decorations

Alexandre Livingstone Smith

Introduction

For a long time, the typology and classification of ceramic decorations primed over the analysis of decorative techniques. In most general works devoted to pottery, technical aspects relating to decoration tend to be only very briefly discussed. Shepard (1956, 194) mentions the great difficulty that can surround the identification of impressed decorations. She recommends experimentation as an aid to the identification of unknown decorative types, but supplies hardly any illustrations. The same is the case for the publications of Rye (1981, 89–95) and Rice (1987, 145); the latter merely mentions the usefulness of plasticine impressions for the identification of decorations. Only Balfet *et al.* (1989), in their lexicon devoted to the description of pottery, consider various impressed decorative techniques and illustrate an African roulette. Although in some parts of the world the study of the impressions of cords and textiles attracted scholarly attention at an early date (for a summary see Hurley 1979, 1–3, and the Introduction to the present volume), in Africa the first significant contributions to the identification of decorative techniques did not come until the 1960s. Although Griaule and Lebeuf (1948, 23) appear to be the first to illustrate the tool, action and impression relating to roulette decorations in the Chad basin, it is to Camps-Fabrer (1966, 429–454) that we owe the first ever chapter wholly dedicated to decorative pottery technologies. The illustrations therein are based on experimental data, and include several impressions made with roulettes of a vegetal origin, such as cobs of maize, plantain or millet. However, Camps-Fabrer advances no suggestions for a potential method of analysis of decorations; the illustrations constitute a sort of self-sufficient experimental reference work.

The 1980s witness the first two major methodological advances: on the one hand, the paper on roulette decorations by Robert Soper (1985), on the other Isabelle Caneva's (1987) chapter on the analysis of impressed decorations of the central Sahara. Soper led the way by introducing a first classificatory scheme for roulettes, based on the materials in which these tools were constructed; his article included illustrations of tools from both ethnographic and experimental sources, alongside their impressions. Caneva's paper, though it did not consider roulettes, offered a methodological advance by stating principles for the identification of tools and actions in the context of impressed decorations from the central Sahara.

In subsequent years, several scholars or groups of scholars have corrected or refined the first model offered by Soper. Among such initiatives, one can cite the organisation by

Méthode d'identification des décors roulés

Alexandre Livingstone Smith

Introduction

La typologie et la classification des décors de la poterie a longtemps pris le pas sur l'analyse des techniques ornementales. Dans la plupart des manuels généraux dédiés à la poterie, les aspects techniques de la décoration sont généralement évoqués de manière très succincte. Shepard (1956, 194) signale la grande difficulté qu'il peut y avoir à identifier des décors imprimés. Elle recommande l'expérimentation pour aider l'identification des décors inconnus, mais ne fournit presque aucune illustration. Il en est de même dans les publications de Rye (1981, 89–95) ou de Rice (1987, 145) – cette dernière se contente de mentionner l'intérêt des moulages en plasticine pour aider à l'identification des décors. Seules Balfet *et al.* (1989), dans leur lexique consacré à la description de la poterie, envisagent différentes techniques de décors imprimés et illustrent une roulette africaine. Si, dans certaines régions du globe, l'étude des impressions de cordages et de textiles a attiré très tôt l'attention de chercheurs (voir Hurley 1979, 1–3, et l'introduction au présent volume, pour un aperçu de la question), en Afrique il faut attendre les années soixante pour voir les premières contributions significatives en ce qui concerne l'identification des techniques de décor. Si Griaule et Lebeuf (1948, 23) sont apparemment parmi les premiers à illustrer l'outil, le geste et l'empreinte d'un décor à la roulette du Tchad, c'est à Camps-Fabrer (1966, 429–454) que l'on doit le premier chapitre entièrement consacré aux technologies ornementales de la poterie. Les illustrations sont basées sur du matériel expérimental et comprennent plusieurs empreintes réalisées avec des roulettes d'origine végétale (épis de maïs, de plantain ou de mil). En revanche, il n'y a pas de proposition pour une méthode d'analyse des décors. Les illustrations présentées constituent en quelque sorte un référentiel expérimental qui se suffit à lui-même.

C'est durant les années quatre-vingt que vont avoir lieu deux avancées méthodologiques importantes, d'une part la publication de Soper (1985) consacrée aux décors à la roulette, et d'autre part celle de Caneva (1987) sur l'analyse des décors imprimés du Sahara central. Le premier ouvre la voie en proposant une première classification des roulettes, basée sur les matériaux avec lesquels elles sont fabriquées. La publication inclut des illustrations d'outils, ethnographiques et expérimentaux, ainsi que leurs empreintes. La seconde n'envisage pas les décors à la roulette, mais constitue une avancée méthodologique en énonçant les principes de l'identification des outils et des gestes concernant les décors imprimés du Sahara central.

Par la suite, plusieurs chercheurs individuels ou groupes de recherche ont affiné ou corrigé les premières propositions de Soper. On notera parmi ces contributions

Olivier Gosselain and Kevin MacDonald of a session at the 1996 meeting of the Society of Africanist Archaeologists (SAfA) in Poznan (Poland), taking African roulettes as a theme, which was followed by meetings at the University of Geneva (Switzerland) and at the Royal Museum for Central Africa (Tervuren, Belgium).[1] Also, two workshops of the 'Céramique Africaine Imprimée' (CERAFIM) group, gathering a great number of researchers, were organised in 2000 and 2003 at the University of Aix-en-Provence by Dominique Commelin and Annabelle Gallin.[2] This work paved the way for an initial analytical approach to impressions by Olivier Langlois and Barbara Van Doosselaere.[3] Finally, several German doctoral theses (for example Wiesmüller 2001, von Czerniewicz 2002), amply illustrated and available on-line, detail numerous decorative variants. Each of these contributions has furthered knowledge in the domain of the classification and nomenclature of tools; but more often than not, identification remains based on a subjective visual appreciation rather than on analytical demonstration. Yet, as Caneva had shown already in 1987, such an analysis is certainly possible.

The aim of this chapter is therefore to demonstrate how one might characterise a tool in a manner which no longer relies on impressionistic data, but instead is based on a detailed analysis of the impressed elements. To this end, the principles and practical aspects of the method will first be outlined; the methodology for the identification of a decoration is then described, and specific case studies presented.

General principles and practical aspects

General principles: identification of the tools and the actions

The technique for the identification of pottery-decorating tools which is presented here is based on principles formulated by Caneva (1987). The basic idea consists in analysing the relationships between impressed elements, so that the acting part of the tool used can be identified. Once this acting part has been defined, the movement can be easily deduced. The development of digital imagery, image-editing and drawing software, allow us to further refine the method. By importing an image of the decorated surface into a vector graphics software package, a much finer analysis of the relationship between impressed elements (teeth of a comb, segments of a cord) becomes possible. One can study the morphology of the impressed elements and of their internal surfaces, the distance relationships between these elements (a series of elements reflects the acting part of the tool), and finally the relations between the various series of elements (this allows one to infer the action applied). As the scale of the images can be calibrated, the size of the tools can be determined – or at least that of their acting part or acting parts.

Practical aspects

In order to carry out the reconstruction of tools and decorative techniques, it is first necessary to obtain digital images of the decorated surface under analysis. The images should be of a high resolution, and calibrated with a scale of between 2 and 5 centimetres. Such images can be obtained through two means.

l'organisation par Olivier Gosselain et Kevin MacDonald en 1996 d'une session portant sur les roulettes africaines au colloque de la Society of Africanist Archaeologists (SAfA) à Poznan, suivi d'une réunion à l'Université de Genève et d'une réunion au Musée Royal de l'Afrique centrale à Tervuren.[1] Par ailleurs, deux réunions du groupe 'Céramique Africaine Imprimée' (CERAFIM), rassemblant de nombreux chercheurs, ont été organisées à l'Université d'Aix-en-Provence par Dominique Commelin et Annabelle Gallin[2] en 2000 et 2003. Ce travail a permis une première approche analytique des empreintes par Olivier Langlois et Barbara Van Doosselaere.[3] Enfin, plusieurs thèses de doctorat allemandes très bien illustrées et accessibles en ligne (Wiesmüller 2001, von Czerniewicz 2002) détaillent de nombreuses variantes ornementales. Chacune de ces contributions a permis des avancées en ce qui concerne la classification et la nomenclature des outils, mais l'identification reste encore la plupart du temps basée sur une appréciation visuelle globale, plus que sur une démonstration analytique. Or, comme l'a montré Caneva dès 1987, une telle analyse est possible.

L'objectif de ce chapitre est donc de montrer comment caractériser un outil d'une manière qui ne laisse plus de place aux 'impressions', mais se fonde sur une analyse détaillée des éléments imprimés. A cette fin, j'envisagerai d'abord les principes et les aspects pratiques de la méthode, avant de décrire la procédure à suivre pour identifier un décor, puis de présenter quelques cas particuliers.

Principes généraux et aspects pratiques

Principes généraux, identification des outils et des gestes

L'identification d'outils est basée sur les principes formulés par Caneva (1987). L'idée est d'analyser les rapports entre les éléments imprimés, afin d'identifier la partie agissante de l'outil utilisé. Une fois la partie agissante définie, le mouvement peut être identifié aisément. Le développement de l'imagerie numérique et des logiciels de traitement d'image et de dessin permettent de raffiner la méthode. En important une image de la surface à analyser dans un logiciel de dessin vectoriel, on peut faire une analyse beaucoup plus fine des rapports entre les éléments imprimés (comme les dents d'un peigne ou les torons d'une corde) : morphologie des éléments et de leur surface interne, rapports de distances entre ces éléments (une série d'éléments reflète la partie agissante d'un outil), et enfin relations entre les séries d'éléments (cette relation permet de déterminer le geste). La possibilité de calibrer l'échelle des images permet de déterminer la taille des outils, ou en tout cas de leur(s) partie(s) agissante(s).

Aspects pratiques

Pour procéder à la reconstitution des outils et techniques ornementales, il faut obtenir des images digitales des surfaces ornées à analyser. Les images doivent être prises avec une bonne résolution et calibrées à l'aide d'une mire de 2 à 5 centimètres. Ces images peuvent être obtenues de deux manières.

The first method, particularly useful on sherds or fragments of minimal curvature, is to capture the image on a flatbed scanner. Ideally, images should be produced at the following specifications: 1:1 size, minimum resolution 600 dpi (1200 dpi for detailed views), as a photographic grayscale image. Scanning images in colour is not recommended, as the resulting files will be too large. For the same reason, it is advisable to save files in the jpeg format. The image should be good enough that it can be enlarged on a computer screen to such a degree that the individual elements making up the impressed decoration (such as the teeth of a comb or the segments of a cord) can be seen. In the best cases, the texture of the elements' surface can be seen, and the nature of the materials used to make up the tool be inferred. Finally, the use of a white background (preferably a cloth) during scanning limits the need for subsequent retouching. The second method consists in obtaining the same type of image using a digital camera. However, images obtained in this way are inevitably of lesser quality. Once digitised, the image is then imported into a vector graphics package, such as Adobe Illustrator or Coreldraw, in a jpeg format.

The identification process

Once the image of the impression has been imported into a graphics package, the identification procedure is as follows. The first stage involves selecting one or several impressed elements that are close to one another and well marked (Figure 2.1). The presence of a specific detail, or of some anomaly, e.g. cracking or pitting, facilitates the recognition of a group of impressions. The outline of the impressed elements making up a group is then inked up using a graphics package.[4] A copy of this cluster of impressions is then produced, and moved horizontally, vertically or diagonally, in order to identify a near-identical cluster: i.e., one with the same morphology, and equidistant elements. In the case of a roulette, one expects to detect a cycle of repetitions, revealed in the recurrence of the identified cluster of impressed elements, since roulettes are tools with a multifaceted acting part. Such cycles of repetition can be highlighted, and the diameter and number of active sides of the tool thus determined. Once the acting part and the movement have been identified, it is possible to infer the shape and dimensions of the tool (Figure 2.2). To this end, one searches above and below the highlighted clusters; it is then possible to determine the length of the tool, and sometimes even to define its entire acting part.

Analysing ethnographic tools and their impressions: some examples

A great deal of variation occurs in impressions, depending on the material (cord, flat fibres, etc.) and the manipulation (folding, knotting, braiding etc.). In addition to these typological variations, further variability arises from the manner of manufacture

La première, particulièrement utile pour les tessons ou les fragments à faible courbure, est d'en saisir l'image sur un scanner à plat. Idéalement, les images saisies doivent avoir les caractéristiques suivantes, taille 1/1, résolution au minimum 600 dpi (pour les vues de détails 1200 dpi), image photographique en niveau de gris. Il est déconseillé de saisir les images en couleur pour éviter que les fichiers résultants ne soient trop lourds. Pour la même raison, il est conseillé de sauver les fichiers en format jpeg. Une bonne image doit permettre d'agrandir l'image sur un écran d'ordinateur de manière à voir les éléments individuels qui composent le décor imprimé (par exemple, les dents d'un peigne, les torons d'une corde). Dans le meilleur des cas, on peut observer la texture de la surface des éléments imprimés et déduire la nature des matériaux utilisés pour fabriquer l'outil. Enfin, l'utilisation d'un fond blanc (un tissu de préférence) permet de limiter les traitements ultérieurs du fond des images. La seconde méthode consiste à obtenir le même type d'image à l'aide d'un appareil photographique digital, mais les résultats sont toujours de moins bonne qualité. Une fois digitalisée, l'image doit pouvoir être importée dans un logiciel de dessin vectoriel sous format jpeg (comme Adobe Illustrator ou Coreldraw).

Procédure d'identification

La procédure d'identification une fois l'image de l'empreinte importée dans un logiciel de dessin vectoriel est la suivante. La première étape consiste à choisir quelques éléments imprimés proches les uns des autres et bien marqués (Figure 2.1). La présence d'un détail spécifique ou d'un défaut, comme une crevasse ou une cupule, facilite la reconnaissance d'un groupe d'empreintes. Les limites des éléments imprimés qui constituent le groupe sont alors surlignées à l'aide d'un logiciel de dessin.[4] On fait ensuite une copie du groupe d'impressions que l'on déplace horizontalement, verticalement et en diagonale, jusqu'à trouver un groupe quasi-identique (même morphologie, et équidistance des éléments). Dans le cas d'une roulette, il faut alors s'attendre à détecter un cycle de répétition, manifesté par la récurrence du groupe d'éléments imprimés, car les roulettes sont un instrument dont la partie agissante est multifacettée. On peut mettre en évidence le cycle de répétition et déterminer ainsi le diamètre de l'outil et le nombre de faces actives. Une fois la partie agissante et le mouvement identifié, il est possible de se faire une idée de la forme et des dimensions de l'outil (Figure 2.2). A cette fin, il faut regarder au-dessus et au-dessous des groupes surlignés. On peut ainsi déterminer la longueur de l'outil, voire définir complètement sa partie agissante.

Analyse d'outils ethnographiques et de leurs empreintes: quelques exemples

Selon les matériaux (cordelettes, fibres plates, etc.) et la manipulation utilisés (pliage, nouage, tressage, etc.), on observe de nombreuses variations dans les empreintes. En plus de ces variations typologiques, on constate des variations dépendant de la manière

(loose, tight) of the tool, its degree of use-wear and clogging, and the way in which it was applied (deeply or shallowly impressed). In order to illustrate the potential of the reconstruction method proposed here, some tools evoked in the general classification (Section 1) will now be examined. In the first case, two tools of which the impressed elements are likely to be confused will be compared: folded and knotted strip roulettes.[5] The second case study will aim to demonstrate that variations in mode of manufacture can be distinguished by determining the number of strands used in making braided strip roulettes.

In the case of the knotted strip roulette, the tool consists of flat fibres, and the various components of the acting part are typically quadrangular or in the shape of a parallelepiped (Figure 2.3; see also Section 1). Quadrangular impressed elements are associated with parts of the tool where the fibre has been looped into the roulette without being twisted. An alternating pattern almost always occurs on the vertical axis: a well-impressed element is succeeded by one that has been less well impressed. This alternating pattern is due to the fact that the roulette is asymmetrical vertically, since the fibre has been knotted over itself (this is clearly visible on the left in Figure 2.3). Moreover, one observes a repetition of the cycle in every fifth impressed element: this indicates that the tool possesses five facets.

In the case of the folded strip roulette (Figure 2.4), the tool is made up of flat fibres, and the various components of the acting part are irregularly-shaped: these are associated with parts of the tool where the fibre was twisted prior to folding. Thus, the impressed elements often take the shape of a parallelepiped, with a concave upper edge and a convex lower edge, giving the appearance of a Z lying sideways. This is especially visible in very tightly-folded strip roulettes, such as the examples shown in Section 1 and 3 (Figures 1.7, 1.10, and 3.37 for example). A repetition of the cycle is visible in every third impressed element: thus one can infer that the tool has three sides. It is apparent by analysing the morphology of the clusters identified, and their spatial relationship, that one cannot mistake folded and knotted strip roulettes.

In the case of a cross-braided strip roulette (Figure 2.5), the tool is made up of five strands of straw. The elements making up the acting part have a quadrangular shape, occasionally that of a parallelepiped, when the roulette is new; but they may become irregular if the tool is clogged up or worn. The repetition cycle here is of ten impressed elements for tools made with five strands, and of twelve for tools made with six strands.

Discussion and conclusions

Materials collected from practicing potters allow us to develop a catalogue of tools and their impressions. Such catalogues, supplemented by experimental work, have long served as a reference for the identification of archaeologically-occurring decorations. Although such an approach is useful, it has a major drawback: it offers global comparisons, without a detailed analysis of the acting part of tools, nor of their impressions. This makes it impossible to establish a reasoned demonstration of the identification process. Yet, ethnographic reference material provides a means of testing

dont l'outil a été fait (lâche ou serré), de son degré d'usure et/ou de saleté, ainsi que de la façon dont il a été utilisé (imprimé plus ou moins fort). Afin d'illustrer le potentiel de la méthode de reconstitution proposée ici, je propose d'examiner quelques outils évoqués dans la classification générale (Section 1). Dans le premier cas, il s'agira de comparer deux outils dont les éléments imprimés sont susceptibles d'être confondus, les roulettes en fibre plate pliée et les roulettes en fibre plate nouée. Dans un deuxième cas, on verra qu'il est possible de distinguer des variantes dans le mode de fabrication en déterminant le nombre de brins utilisés pour fabriquer des roulettes en fibre plate tressée.

Dans le cas d'une roulette en fibre plate nouée, l'outil est constitué de segments de fibres plates, et les différents éléments de la partie agissante sont le plus souvent quadrangulaires ou parallélépipédiques (Figure 2.3 ; voir aussi Section 1). Les éléments imprimés quadrangulaires sont associés aux parties de l'outil où la fibre rentre dans l'outil sans torsion. Il y a quasiment systématiquement une alternance, sur l'axe vertical, entre un élément bien imprimé et un moins bien imprimé. La raison de cette alternance tient à l'asymétrie verticale de l'outil liée au nouage d'une fibre sur elle-même (bien visible à gauche sur la Figure 2.3). Enfin, on note une répétition du cycle tous les cinq éléments imprimés ; l'outil est un pentaèdre (cinq côtés).

Dans le cas d'une roulette en fibre plate pliée (Figure 2.4), l'outil est constitué de fibres plates et les différents éléments de la partie agissante sont de forme irrégulière – associés à des parties de l'outil où la fibre est tordue avant d'être pliée. Les éléments imprimés ont donc souvent la forme d'un parallélépipède dont le bord supérieur est concave et le bord inférieur convexe, donnant l'impression d'un Z couché ; cette impression est plus forte dans le cas de roulettes de fibre plate pliée serrées (voir par exemple les outils illustrés dans les Sections 1 et 3 ; Figures 1.7, 1.10, et 3.37 par exemple). On note enfin une répétition du cycle tous les trois éléments imprimés. L'outil est un trièdre (trois côtés). On le voit en analysant la morphologie des groupes identifiés et leurs relations spatiales, il n'est pas possible de confondre les roulettes de fibre plate pliée et nouée.

Dans le cas d'une roulette de fibre plat tressée croisée (Figure 2.5), l'outil est constitué de cinq brins de paille. Les différents éléments de la partie agissante sont de forme quadrangulaire, parfois parallélépipédique, quand l'outil est neuf, mais ils peuvent être de forme irrégulière si celui-ci est sale ou usé. Le cycle de répétition est de dix éléments imprimés pour les outils à cinq brins, et de douze éléments imprimés pour les outils à six brins.

Discussion et conclusions

Les objets collectés auprès de potiers et potières en activités aujourd'hui permettent de concevoir un catalogue d'outils et leurs empreintes. De tels catalogues, suppléés par des démarches expérimentales, ont longtemps servi de référence pour l'identification des décors en archéologie. Quoique fort utile, cette démarche présente l'inconvénient majeur d'avoir toujours proposé des comparaisons globales, sans analyse détaillée de la partie agissante des outils, ni de leurs empreintes. En bref, ce type d'approche ne permet pas de démonstration raisonnée de la procédure d'identification. Pourtant, le référentiel ethnographique permet de tester des méthodes de reconstitution des outils

the methods deployed to reconstitute tools and decorative techniques in archaeology. The method of decoration analysis proposed by Caneva (1987), coupled with modern means of image capture and treatment, becomes a powerful tool for the identification of decorative *chaînes opératoires*.

It is possible at this stage to outline a series of general principles. If all of the impressed elements have the same shape, but are spatially independent, this indicates we are faced with single impressions using a stylus. If, however, there exists a spatial relationship between several elements that are always equidistant, then a more complex tool, such as a comb, roulette or net is involved. In order to identify this tool, we select some impressed elements lying on the same axis, and check whether they reoccur together elsewhere on the surface. If they do, the identification can be extended to determine the minimum number of impressed elements that find themselves systematically associated. This group constitutes the negative of the acting part of the tool. If the elements associated on an axis are repeated side by side, then we are dealing with a comb. If however they are repeated in cycles and each series is separated from the next by a set of distinct impressed elements, then we are dealing with a roulette. In this last case, the cycle of repetition depends on the how many sides the tool has.

The main advantage of this method is that it allows us to identify the tool and the decoration technique in a reasoned manner. It is no longer a question of expert opinion, but rather a well-supported, argued characterisation. Moreover, it becomes possible to identify sets of vessels that were decorated with a single tool, the production of a single artisan, or of a community of artisans using the same tools.[6] Such identifications allow a finer-grained analysis of sites, be it in terms of chrono-stratigraphic analysis or in terms of social inference.

This method has its limits. For a start, very flexible tools, such as cord roulettes, are likely to twist when rolled over the surface of the vessel. Irregularities can therefore occur in the cycle of repetitions. Two additional problems, specific to archaeological materials, arise: state of conservation, and difficulty in applying the (time-consuming) method of analysis described here to what are often very large assemblages. As far as state of conservation is concerned, nothing can be done: if only sherds with heavily eroded surfaces are available for analysis, then the method described here cannot achieve the impossible. As regards the applicability of the method to large assemblages, the same problem occurs with any type of analysis: as such, targeted sampling is necessary (one type of vessel, one excavated unit, one context, etc.). The detailed analysis of a representative sample should in any case considerably facilitate the cursory analysis of large assemblages, and assure its pertinence.

Finally, the approach advocated here offers a major advantage: it is independent of ethnographic data. Thus, one might very well identify and reconstruct tools and actions that are unknown in the present.

et techniques ornementales en archéologie. La méthode d'analyse des décors proposée par Caneva (1987), couplée aux moyens actuels de saisie et d'analyse d'images, s'avère un outil puissant pour l'identification des chaînes opératoires ornementales.

Il est possible de définir une série de principes généraux. Si tous les éléments imprimés sont de formes identiques, mais sont spatialement indépendants, il s'agit alors d'impressions simples à l'aide d'un poinçon. En revanche, s'il existe une relation spatiale entre plusieurs éléments toujours équidistants, il s'agit d'un outil plus complexe, comme un peigne, une roulette ou un filet. Pour identifier l'outil, il faut choisir quelques éléments imprimés sur le même axe, et vérifier si ceux-ci sont associés en plusieurs endroits de la surface. Si c'est le cas, on peut étendre l'identification jusqu'à déterminer le nombre minimum d'éléments imprimés qui se trouvent systématiquement associés. Ce groupe constitue le négatif de la partie agissante de l'outil. Si ces éléments associés sur un axe se répètent côte à côte, c'est qu'il s'agit d'un peigne. Si ces éléments se répètent de manière cyclique et que chaque série est séparée des autres par une série d'éléments imprimés distincts, c'est qu'il s'agit d'une roulette. Dans ce dernier cas, le cycle de répétition dépend du nombre de faces que possède l'outil (trièdre, quadrèdre, pentaèdre, etc.).

Le premier avantage de cette méthode est qu'il permet d'identifier un outil et une technique de décor de manière raisonnée. Il ne s'agit plus de l'opinion d'un expert, mais bien de caractérisation argumentée. Par ailleurs, il est possible de mettre en évidence des séries de récipients décorés avec le même outil. Il est donc possible d'identifier la production d'un artisan – ou de plusieurs artisans travaillant avec les mêmes outils.[5] De telles identifications permettent des analyses plus fines des sites, qu'il s'agisse d'analyses chrono-stratigraphiques ou d'inférences sociales.

Cette méthode n'est pas sans limite. Tout d'abord, les outils très flexibles, comme les roulettes en cordelette, sont susceptibles de se tordre lorsqu'on les roule à la surface du récipient. Il peut donc y avoir des irrégularités dans les cycles de répétition. Ensuite, le degré de conservation des poteries archéologiques ou la difficulté d'appliquer ce type d'analyse détaillée à de larges assemblages (en raison du temps d'analyse requis par tesson) sont susceptibles de poser problème. En ce qui concerne le degré de conservation, il n'y a rien à faire. Si l'on ne dispose que d'un tesson dont les surfaces sont largement érodées, la méthode d'analyse proposée ici ne fera pas de miracle. En ce qui concerne l'applicabilité de la méthode à de larges assemblages, le problème est le même pour n'importe quel type d'analyse. Il faut alors procéder à un échantillonnage logique (un type de récipient, un carré de fouille, un horizon, etc.). Il est clair que l'analyse détaillée d'un échantillon représentatif doit considérablement faciliter l'analyse sommaire de grands assemblages et en assurer la pertinence.

Pour finir, cette approche présente un intérêt majeur. Elle est indépendante du référentiel ethnographique. On peut en effet très bien imaginer identifier et reconstituer de cette manière des outils et des gestes inconnus aujourd'hui.

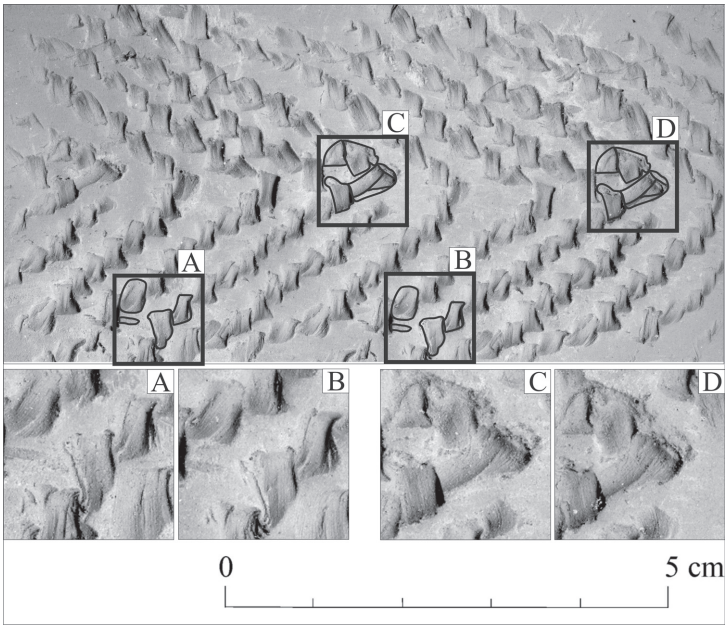

Figure 2.1. In this figure, it can be seen that the group highlighted in A is identical to that in B, and that the group highlighted in C is identical to that in D. If the groups of impressions are cyclical, then we are dealing with a rolled tool with several facets.

Figure 2.1. Sur cette figure, on voit que le groupe surligné en A est identique à celui surligné en B et que le groupe surligné en C est identique à celui observé dans le carré D. Si les groupes d'empreintes sont cycliques, c'est qu'il s'agit d'un outil roulé à plusieurs facettes.

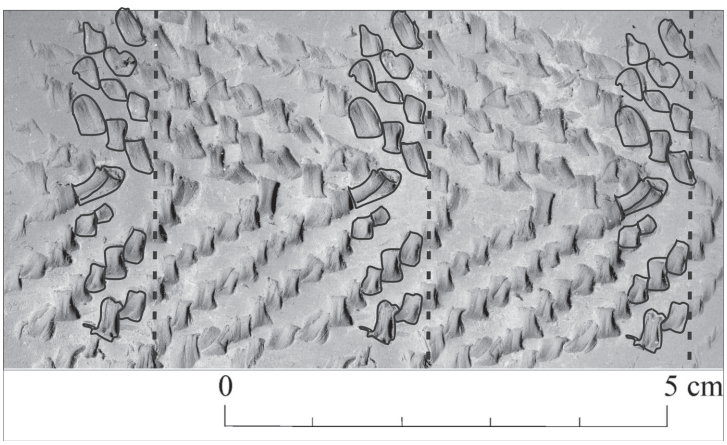

Figure 2.2. Continuing the analysis (it is the same impression as Figure 2.1), one notes that the acting part is vertical, and that it is repeated in every fifth column of elements; it is a tool with five braided strips. There is a strong coherence in clusters, with little distortion from one cycle to the next: because it is a tool with a core, which gives it a certain rigidity. The diagonal configuration, with inversion at the centre of the tool, is typical of an alternately-braided strip roulette.

Figure 2.2. Si l'on poursuit la reconstruction (il s'agit de la même empreinte que Figure 2.1) on constate que la partie agissante est verticale et se répète toutes les cinq colonnes d'éléments, il s'agit d'un outil à cinq brins tressés. La cohésion des groupes est forte (il y a peu de déformation des impressions d'un cycle à l'autre), parce que c'est un outil sur âme, ce qui lui donne une certaine rigidité. La configuration diagonale avec inversion au centre de l'outil est typique d'une roulette en fibre plate tressée alterne.

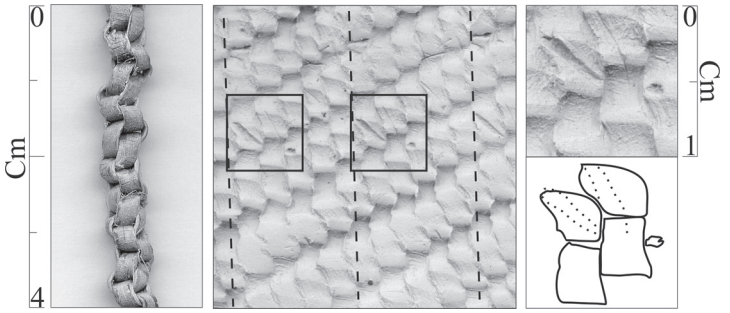

Figure 2.3. Knotted strip roulette, Mambila, Cameroon (O. Gosselain). The elements are of a quadrangular or irregular shape. The fibre impressions on the internal surface indicate the orientation of the axis of the tool. One row out of every two is weakly impressed due to the asymmetry of the tool. One notes that in every fifth column of impressed elements there occurs a repetition in minor faults of the tool. Although this is not in fact the case, here one would expect distortions to occur from one cycle of impressions to the next, as this tool is flexible.

Figure 2.3. Roulette en fibre plate nouée, Mambila, Cameroun (O. Gosselain). Les éléments sont de forme quadrangulaire ou irrégulière. Les empreintes de fibres sur la surface interne indiquent l'orientation de l'axe de l'outil. Une rangée sur deux est faiblement imprimée en raison de l'asymétrie de l'outil. On note la répétition de petits défauts de l'outil toutes les cinq colonnes d'éléments imprimés. Bien que ce ne soit pas le cas, ici on peut s'attendre à des déformations d'un cycle d'impressions à l'autre – car il s'agit d'un outil flexible.

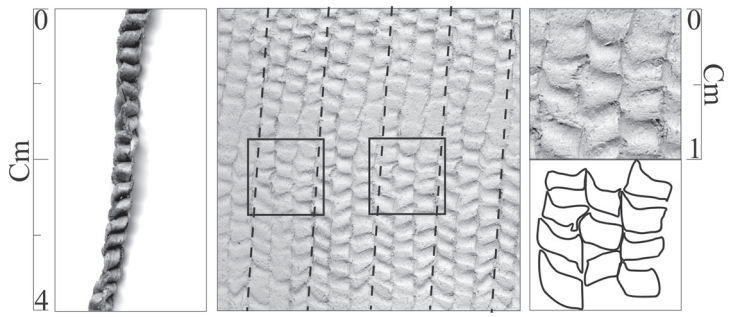

Figure 2.4. Folded strip roulette, Dowayo, Cameroon (A. Livingstone Smith, O. Gosselain). The components of the acting part of this tool are irregular in shape, because the strip was twisted prior to being folded. The impressed elements, often take the shape of a parallelepiped, with a slightly concave upper side and a convex lower edge. The cycle is repeated in every third column of impressed elements. One would expect a strong distortion from one cycle to the next, as this is a very flexible type of tool. Compare Figures 1.6 and 1.9.

Figure 2.4. Roulette en fibre plate pliée, Dowayo, Cameroun (A. Livingstone Smith, O. Gosselain). La partie agissante de cet outil est faite d'unités de forme irrégulière – parce que la fibre est tordue avant d'être pliée. Les éléments imprimés ont souvent la forme d'un parallélépipède dont le bord supérieur est légèrement concave et le bord inférieur convexe. Le cycle se répète toutes les trois colonnes d'éléments imprimés. On peut s'attendre à une forte déformation d'un cycle à l'autre, car ce type d'outil est très flexible. Comparer Figures 1.6. et 1.9.

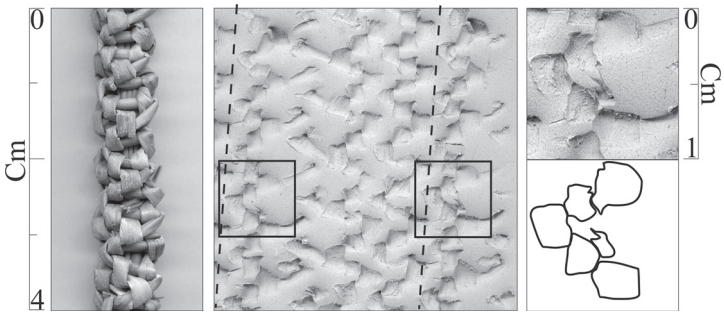

Figure 2.5. Braided strip roulette, Dyoula (Burkina Faso, A. Livingstone Smith). The acting part of the tool is constituted of elements that have a rectangular or irregular shape; the impressed elements can be either vertical or slightly diagonal. The acting part of the tool is vertical, and a cycle of repetition occurs in every tenth column of impressions; this is a tool consisting of five braided strands. There is a strong coherence in clusters, with little distortion from one cycle to the next, indicating a tool with a core, which gives it a certain rigidity. The vertical zigzag configuration is typical of a cross-braided strip roulette.

Figure 2.5. Roulette en fibre plate tressée, Dyoula, Burkina Faso (A. Livingstone Smith). La partie agissante de l'outil est constituée d'éléments de forme rectangulaire ou irrégulière – les éléments imprimés peuvent être soit verticaux ou soit légèrement en diagonale. La partie agissante de l'outil est verticale et connaît un cycle de répétition toutes les dix colonnes d'impression, car il s'agit d'un outil à cinq brins tressés. La cohésion des groupes d'empreintes est forte (il y a peu de déformation d'un cycle à l'autre), parce que c'est un outil sur âme, ce qui lui donne une certaine rigidité. La configuration en zig-zag vertical est typique d'une roulette en fibre plate tressée croisée.

Notes

1 Unfortunately, the plan to publish the data resulting from these meetings was abandoned. Only an unpublished PDF document exists. The slides taken of the tools and their impressions are available for study at the Archaeology Section of the Royal Museum for Central Africa (Tervuren).
2 This led to a publication (issue 13 [2004] of the journal *Préhistoire Anthropologie Méditerranéennes*) and to a website, *CERAFIM: Céramique Africaine Imprimée*, which includes, in particular, illustrations and an online bibliography (see http://cerafim.free.fr/francais/Sommaire.html).
3 This roulette classification, which includes analytical descriptors, can be found on the CERAFIM website, see note 2 above.
4 These can be grouped in order to facilitate subsequent manipulations.
5 On this potential for confusion, see also on this Haour and Keita, and Haour, Section 3, this volume.
6 Indeed, an experiment carried out on a group of ethnographic ceramics demonstrated that it is possible to distinguish workshops on the basis of their ceramic production (Gosselain and van Berg 1991–92). The only error made was the attribution to the same potter of vessels that were in fact made by two sisters, working at the same time and with the same tools.

Notes

1 Le projet de publication a malheureusement été abandonné. Seul un document inédit circule sous format PDF. Les diapositives des outils et de leurs empreintes sont disponibles à la Section d'Archéologie du Musée royal de l'Afrique centrale (Tervuren).
2 Ces réunions ont débouché sur une publication (Numéro spécial de *Préhistoire Anthropologie méditerranéennes,* no. 13) et un site web, *CERAFIM : Céramique Africaine Imprimée*, incluant des illustrations et une bibliographie en ligne (voir http//cerafim.free.fr/francais/Sommaire.html).
3 Cette classification de roulettes comprenant des descriptifs analytiques se trouve sur le site web du CERAFIM, voir note 2 ci-dessus.
4 On peut les grouper pour faciliter les manipulations ultérieures.
5 En effet, un test mené sur un ensemble de céramiques ethnographiques a montré qu'il était possible de distinguer des ateliers sur base de leurs productions céramiques (Gosselain et van Berg 1991–92). La seule erreur commise fut d'attribuer à la même potière des récipients fait par deux sœurs travaillant en même temps et avec les mêmes outils.

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SECTION 3

Introductory note: how archaeologists work

Anne Haour and Katie Manning

So far, we have dealt with methods of fabrication and distribution of potters' roulettes in the present day. The following section moves us further back in time, using the archaeological record to trace the occurrence of these tools in the past. Pottery is often the most common artefact recovered from archaeological sites, usually in the form of small, and sometimes heavily eroded, sherds. The fragmentary nature of this record therefore demands that we approach roulettes not from the tool itself, as is possible in studies of modern roulettes, but from the impressions they leave on clay surfaces. It is only through the systematic and detailed recording of these impressions, and through close cross-referencing with the ethnographic record (Section 1), that we can gain reliable insight into the toolkits of potters in the past.

Approaches to archaeological pottery analysis vary considerably, although some general conventions are usually respected. Sherds will typically be bagged by context during excavation, and subsequently washed to reveal more clearly the fabric and any additional surface decorations. It is not uncommon for one member of the team to take on responsibility for pottery analysis, and for this analysis to be carried out in parallel with the excavations: this is particularly the case if the researchers are based in another country, as it is not feasible for the entire pottery collection to be shipped abroad for later inspection. On some projects, however, analysis might be carried out as a team activity, involving an iterative process, or by several pottery specialists over successive seasons of fieldwork (e.g. during the Dia project [Bedaux *et al.* 2005]).The number of analysts, and any differences in their approaches, may impact upon the consistency

of the recording process. This chapter hopes to go some way towards providing a standardised means of characterising impressions, in order to minimise discrepancies and aid inter-site comparative studies.

Most practitioners nowadays employ single attribute recording, in which a series of variables are recorded for each potsherd in at least some subset of the assemblage. With very large assemblages it is occasionally the case that the collection is reduced in size through random sampling (e.g. 'mix-and-divide') in order to keep analysis within a manageable timeframe. It is also often the case that a simple rule will be applied to exclude from analysis sherds that are smaller than a given size (e.g. 2.5 cm diameter) as being too difficult to reliably analyse; as demonstrated in Section 2 of this volume, the most dependable identification of impressed decorations is achieved through tracking repetitions in the impression, and this is not possible on very small sherds.

The recording of surface decoration is an important aspect of pottery analysis and most commonly involves identifying the impression type/decorative tool, the position of the decoration on the vessel and the motif created through the combination of different decorative techniques. Plasticine is often used to take a cast of the impression, revealing in much greater detail the imprint of the original tool (Figures 3.1a and 3.1b). Nonetheless, criteria used in characterising different decorative types are rarely made explicit in publications and images provided of type-sherds are often limited in number. Again, we hope that the present volume goes some way towards rationalising this stage of the pottery analysis. Other variables often considered in pottery analysis are fabric (including temper), wall thickness, firing method and surface treatments such as burnishing or slipping; moreover, for rim sherds, the shape, angle, and curvature of the rim (to infer the diameter of the vessel) will be recorded. S. McIntosh (1995, 131–144) offers a good description of this process.

In the following section a standard format has been adopted for the content of each entry: first describing the appearance of the material, then identifying – on the basis of experimental and ethnographic analogy – the roulette responsible for the decorative motif, and finally giving a sense of the known chronological and spatial distribution of the decorative type. The illustrations are drawn largely from the collections of the various contributors to this manual; as such, there is a focus on their area of specialism and on West African material. However, where necessary – for example, in the case of decorative motifs which do not appear frequently, or at all, in West Africa, e.g. knotted strip roulette impressions – illustrations have been solicited from colleagues working in other parts of the continent.

In keeping with the structure introduced earlier in this book, we focus on the material from which the roulette is made, the manipulation to which this material was subjected and the action that was used to apply the roulette. The identification of a decoration must be a reflexive process, using both impression and a sense of the tool to inform our description. However, it should be recognised that the archaeological data, by its very nature, presents us with fewer certainties than does modern material. Consequently, we feature in Section 3 only roulettes which are at present confidently and reliably recognised archaeologically. As such, this survey does not, and cannot, aim to be a comprehensive review of all roulettes found in the archaeological record; in fact, we hope this manual will act as a foundation to which new types and variants can be added. In addition,

since we have placed the emphasis on the recognition of underlying regularities (for example, the direction of rolling, the orientation of individual segments and beads within impressions, and the angularity of imprints) which enable a successful identification and provide a means for standardised recognition, we have only included roulettes that are subject to such underlying principles. Carved or natural roulettes are thus excluded' although we refer the reader to Section 1 for their discussion and description.

The location of the sites mentioned can be found on Maps 1–3.

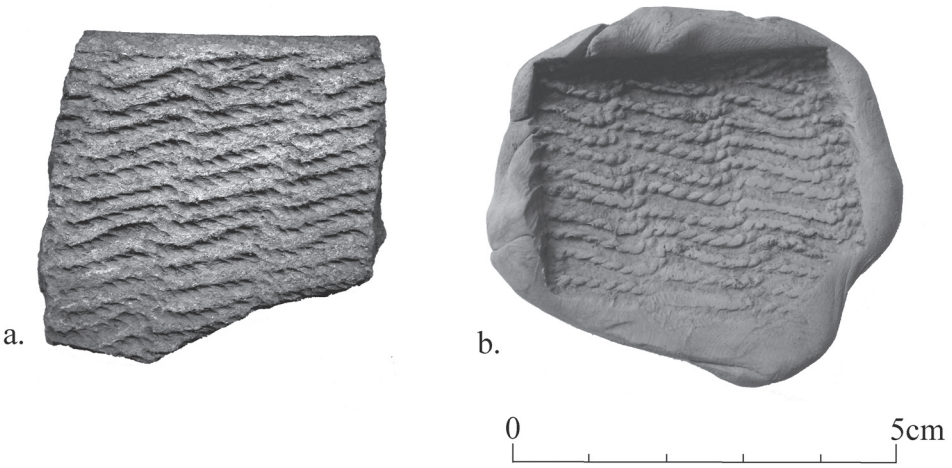

Figure 3.1 a: Sherd recovered from excavations at Er Negf, Lower Tilemsi Valley, Mali, mid-third millennium BC. Photo: Katie Manning; b: Plasticine cast of this sherd, illustrating in much greater detail the individual segments of the cord impression and repetitions in the pattern, revealing it to be a rolled split stick with overlapping cord (compare Hurley 1979, Cords 249–252). Photo: Katie Manning.

Twisted cord roulette
Roulette de cordelette torsadée

Noemie Arazi and Katie Manning

Appearance of the archaeological material

Sherds bearing impressions of a rolled twisted cord roulette generally display parallel diagonal rows of oval or rounded concave impressions (described by Hurley 1979, 6, as segments). The rows of segments are generally flush with one another, and when rolled, the angle of the individual segments relative to the row of impressions is typically around 90 degrees to the horizontal depending on how tightly the cord has been twisted. On plasticine casts or well-preserved sherds, fibre impressions are often visible within these segments, revealing sub-division of multiple interior beads (reflecting the number of strands used in the manufacture of the base cord).

Description of the tool

These impressions result from the use of a roulette made of twisted cord, where 'cord' encompasses any fibre with a rounded cross-section, derived from materials such as pulped bark, grass, or strands of cotton (Soper 1985, 35; Section 1, this volume). The most common form is a twisted cord that has been doubled over and re-twisted, usually at least twice (Hurley 1979, 28)[1]. These roulettes are either rolled on the wet clay (see Figures 3.2–3.5) or single-impressed (see Figure 3.6). On rolled impressions, the individual segments stand at a wide angle to the row (approximately 90 degrees to the horizontal), but if the twisted cord roulette is single-impressed the angle is significantly narrower (Soper 1985, 35); this is readily seen by comparing Figures 3.2 and 3.6. That said, the angle of individual segments will be determined essentially by how tightly the cord has been twisted. Figure 3.3, for example, shows a rolled twisted cord roulette with segments set at an angle of about 70 degrees indicating that the cord was tightly twisted.

Further manipulations can also be made to the twisted cord roulette, including the addition of extra strands of cord (thereby creating twisted multiple-cord roulettes), or subsequent manipulations such as knotting or looping. These are described in a separate section below.

Twisted cord roulettes and their impressions vary with the nature and thickness of the fibres used, the tightness of the twist, and the number of times the implement is doubled up, whether upon itself or with one or more additional lengths of cord.

The direction of twist, that is to say, whether the final twist given to the roulette was to the left as in an 's' twist, or to the right as in a 'z' twist, also has an impact on the final product: it will appear reversed in the impression (Hurley 1979; Soper 1985, 35). Most researchers tend not to subdivide the twisted cord roulette category very finely, for instance choosing simply to distinguish fine and thick variants (e.g. Mayor 2005; Wiesmüller 2001). However, it is clear that a vast number of manipulations are possible. Indeed, Hurley (1979) illustrates over 175 experimental variants of twisted cord roulettes and twisted multiple-cord roulettes, and is a definitive source for this kind of tool. He demonstrates that multiple cords can be twisted together, the number used affecting the number of subdivisions (or beads) within each segment (see especially his Cords 87, 88 and 110; and Figure 3.5 below). Likewise, cords of different sizes and direction of twist might be combined, resulting in varying effects (see especially his Cords 89–106; and Figure 3.4 below). It is, indeed, relatively straightforward, even on archaeological material, to distinguish twisted cord roulettes involving a single cord from those employing multiple cords; an example is provided by Wiesmüller (2001, fig. 42b.2.1d/e/f). Whilst the impression made by this multiple-cord variant exhibits the characteristic diagonal rows, additional sub-divisions or beads can also be clearly distinguished. The appellation of such variants is, however, not yet uniform, and it may be that future archaeological research will identify further subdivisions within the twisted cord roulette family.

Variants on twisted cord roulettes

Knotted twisted cord roulette

This tool is essentially a twisted cord roulette which has been subsequently knotted. It can involve just a single knot – either at the extremity of the tool (Figures 3.2 and 3.6) or midway along its length – or multiple knots, added at spaced intervals (Figures 3.7 and 3.8).

The addition of a simple overhand knot to a basic twisted cord will create undulating lines that criss-cross, forming a continuous figure of eight impression (Figure 3.6). Depending on the number of times the cord has been knotted, the sherd may show a single row, or numerous parallel rows, of such undulating lines (Figures 3.7 and 3.8). Furthermore, the thickness of the cord, the number of strands twisted together and the tightness of the knot will create variations in the shape and degree of undulation seen within the impression (compare for example Figures 3.7 and 3.8). It is important to note that the angle of the oblique rows of twisted cord impressions will remain the same on either side of the subsequent knot. Only knotted twisted cord roulettes involving simple overhand knots have been identified so far in the West African archaeological record, but more complex knotting techniques may well have be used to create more elaborate impressions (e.g. Hurley 1979; Cords 195–198).

Looped twisted cord roulette

Looped twisted cord roulettes are made of two or more twisted cords, which are looped

together by doubling over one cord and inserting a second cord through the loop. These tools can combine two or more twisted cords with the same angle of orientation (e.g. with the segments of both cords running, for example, from lower left to upper right), or they can combine twisted cords with opposing angles of orientation. Hurley (1979, 74–76) describes a further loop manipulation, which entails doubling over a twisted cord, pushing the non-looped ends through the looped end, and pulling tight to form a knot. The resulting impression is almost identical to a knotted twisted cord roulette (see Hurley's Cords 182–191), and in fact this manipulation could be considered to be either looping or knotting.

The impression made by such roulettes will display an intermediate join between the two looped cords, with a distortion of the segments at the point of juncture. The angle of the oblique rows of cord impressions may remain the same, or may be reversed on either side of the join (Figure 3.9), depending on whether the tool combines twisted cords with the same or opposing angles of orientation.

Terminology and distribution

As noted by Mayor *et al.* (2005), twisted cord roulettes have been in use over a long period and a wide geographical area, and as such, after an initial phase of onset, cannot be considered a very sensitive diagnostic tool.

However, the question of the appearance and initial spread of twisted cord roulettes may well be fundamental for the African past. To date, the earliest impressions of twisted cord roulettes are known from the Lower Tilemsi Valley in Mali, dating from the mid- to late third millennium BC (Manning 2008). Two of these sherds, bearing impressions of a twisted cord roulette and knotted twisted cord roulette, have been directly dated on their organic chaff component to 4121±31 (OxA-X-2287–28), or 2867–2579 BC and 3687±30 (OxA-X-2287–25), or 2196–1976 BC respectively. Both of these sherds also feature impressions of domestic pearl millet (*Pennisetum glaucum*), thus constituting the earliest archaeobotanical evidence for cereal agriculture in Africa outside of the Nile Valley (Manning *et al. in press).* Additional dates from the site of Karkarichinkat Nord, where twisted cord roulette impressions are abundant, reveals a tight chronological bracket for the early occurrence of this tool, between 2500 and 2400 BC. The subsequent dispersal of twisted cord roulettes appears to follow a southward temporal expansion, occurring across the West African southern Sahara by the start of the second millennium BC. Recent research in south-eastern Mauritania demonstrates the occurrence of twisted cord roulettes in the Early Tichitt phase, between 1700–1500 BC (MacDonald *et al.* 2009). Around the same time, important agricultural developments were taking place in this region, with directly-dated domestic pearl millet at Dhar Tichitt (at the site of Village 72; Amblard 1996; Amblard-Pison 2006) and Djiganyai, Dhar Néma (Fuller *et al.* 2007). Further to the south, twisted cord roulettes also occur frequently at Windé Koroji Ouest, dated to about 2100 BC (MacDonald 1996). To the east and south, for example in the Chad basin, however, geometric designs and impressed and pivoted comb decorations continue to dominate (Wendt 2007). In the current state of knowledge, then, twisted cord roulette impressions appear to be limited to the western zones of West

Africa, often in association with early millet agriculture; but the paucity of comparative regional data makes interpretation of these tentative correlations problematic.

Twisted cord roulette impressions have otherwise been identified on ceramics from Rim (Burkina Faso) from about 3500 years ago (Andah 1978), the Tibesti region of Chad by around 3000 years ago (Schuck 1989), and at the rockshelter of Sopie in Liberia (Atherton 1972) from about 2500 years ago. Certainly, by about 2500 years ago twisted cord roulettes had been adopted throughout most regions in the Sahel savanna zones of West Africa. They become dominant during the second half of the first millennium BC at the sites of Mege, Kursukata and Ndufu in the Nigerian Chad basin, gradually taking over from the cord-wrapped roulettes which had previously held a monopoly (Wiesmüller 2001). Around the same time, they are found in the earliest levels at Dia (around 800 BC) and Jenné-jeno (around 250 BC) (S. McIntosh 1995; Schmidt *et al*. 2005), and in Central Mali (Mayor *et al*. 2005), the Senegal Valley (S. McIntosh *et al*. 1992; S. McIntosh and Bocoum 2000), and at Oursi in Burkina Faso by at least the mid- to late first millennium AD (von Czerniewicz 2002). In the Great Lakes region of East Africa, these impressions appear much later, around the end of the first millennium AD (Desmedt 1991), while in southern Sudan they have been identified around the second half of the first millennium AD at the site of Jebel Tukyi (David *et al*. 1981).

In the literature, these implements and their impressions are known as *twisted cord roulettes* (Twine 6 by S. McIntosh 1995; CR-6 by Schmidt *et al*. 2005), *twisted twine roulette* (MacDonald 1996), *roulette de cordelette* (Vernet 1993, 224), *cordelette torsadée* (Mayor 2005) and *gezwirntes biegsames Schnurroulette* (Wiesmüller 2001).

Knotted twisted cord roulettes generally appear in association with twisted cord roulettes. They occur alongside the earliest known examples of twisted cord rouletting in the Lower Tilemsi Valley (Manning 2008) and at Dhar Tichitt (Holl 1986), and have also been recorded from later time periods in Mali (e.g. at Windé Koroji Ouest [MacDonald 1996]), in Burkina Faso (Lingané 1995), the Middle Senegal Valley (Deme and S. McIntosh 2006; S. McIntosh *et al*. 1992) and Cameroon (Marliac 1991). Generally, knotted twisted cord roulettes appear to be most common during the 'Ceramic LSA'/'Neolithic' (2500 BC–800 BC approximately), and are subsequently quite rare.

In the literature, these roulettes have been known as '*knotted string roulette*' (Wiesmüller 2001) or '*knotted cord roulette*'. But in the present volume, they have been named 'knotted twisted cord roulette' to provide the most accurate description of the tool itself. Knotted cord roulettes as described by Soper (1985, fig, 4) are distinct from knotted twisted cord roulettes and are not known ethnographically (Section 1).

Looped twisted cord roulettes only rarely feature in the archaeological literature, despite being fairly diagnostic (especially variants that include two cords with opposing angles of orientation). They are present in the earliest levels in the Lower Tilemsi Valley by the mid-third millennium BC (Figure 3.9), and are also known at Jenné-jeno (S. McIntosh 1995's Twine 12) by the end of the first millennium BC. The lack of recognition of these roulettes may be due to their being mis-identified as a twisted cord roulette; when dealing with fragmentary sherds, the point of juncture between the two elements of twisted cord can be easily lost. Furthermore, if the two cords used were very fine, and both were twisted in the same direction, the point of juncture may not even be visible in impression.

Sources of confusion

Twisted cord roulettes may be confused with cord-wrapped roulettes (see MacDonald and Manning, this volume), due to the fact that the acting part of both tools consists essentially of a twisted cord. However, unlike twisted cord roulettes, which produce diagonal rows of cord impressions with segments angled perpendicular to the rows, a rolled single-cord-wrapped roulette will produce parallel rows of cord impressions with segments set at an oblique angle to the rows (see MacDonald and Manning, this volume).

A further potential confusion arises with braided strip roulettes. If heavily eroded, braided strip roulette impressions can lose their typically angular appearance, and seem more akin to the rounded oval or oblong beads of a twisted cord roulette (see Figure 3.3 and Mayor, this volume).

Finally, there can arise confusion between twisted cord roulette and mat impressions. Though the units of a mat impression can be oval or rounded in appearance, they are often more elongated than is typical of the twisted cord segments. However, this distinction can be lost if impressions have suffered from erosion. Instead of showing a typically flat, interlaced pattern (Section 1, Figures 1.31 to 1.35), eroded mat impressions can resemble the diagonal parallel rows of twisted cord roulettes. The fragmentary nature of archaeological material often makes it impossible to trace the direction of the impression, complicating further the identification process. For small sherds that do not allow for the characteristic repetitions of a roulette to be detected, the best possible means of distinguishing a mat impression is to look for the elements of weave in a plasticine cast.

Selected archaeological instances

Lower Tilemsi Valley, multiple sites, Mali, 2600–2000 BC
Twisted cord roulette ('CR-6'), impressed twisted cord roulette (CI-1 or CI-2), knotted twisted cord roulette ('CR-1') and looped twisted cord roulette (CR-7) (Manning 2008, fig. 5.6).

Dhar Tichitt, Dhar Walata, Dhar Néma, multiple sites, Mauritania. From 1900 BC onwards
'Twisted cord roulette' (MacDonald *et al*. 2009).

Windé Koroji Ouest, Mali, 2100–1100 BC
'Twisted twine roulette', 'knotted twine roulette' (MacDonald 1994; 1996).

Kolima Sud and other sites, Méma region, Mali, second millennium BC
'Twisted twine roulette' (MacDonald 1994).

Boase sites, Ghana, 1600–1400 BC
'Twisted twine roulette' (Watson 2005, fig. 7).

Mege, Kursakata and Ndufu, Chad Basin, Nigeria, mid to late first millennium BC
'Gezwirntes Schnurroulette mit einem (mehreren) Knoten' (Wiesmüller 2001, plate 3a), 'Gerzwintes Schnurroulette' (Wiesmüller 2001, plate 4), 'Einfach gezwirntes Schnurroulette aus mehreren Strängen' (Wiesmüller 2001, plates 4, 6, 21a).

Jenné-jeno, Mali, from about 250 BC onwards
Twisted cord roulette – thin variant ('Twine 6'), twisted cord roulette – thick variant ('Twine 7'), and twisted looped cord roulette ('Twine 12') (S. McIntosh 1995, plates 6, 11).

Dia, Mali,from 800 BC onwards
Twisted cord roulette ('CR-6') (Arazi 2005; Schmidt *et al.* 2005, fig. 7.1.7 i).

Bandiagara cliff, Toloy, Mali, ca. 300–200 BC
'Impressions à la roulette de cordelette: cordon fin, moyen, grossier,alternant' (Bedaux and Lange 1983, fig. 1, Types 1d1–1d3; double twisted cord roulette shown on fig. 2.4).

Promontoire d'Ounjougou and Dangandouloun rock shelter, Bandiagara Plateau, Mali, mid- to late first millennium AD
'Twisted twine roulette impressions' (Mayor *et al.* 2005, fig. 4).

Niger Bend, Mali and Burkina Faso, proliferating in the first millennium AD
'Twisted cord roulette impressions' (Mayor, *in press*, fig. 8, top).

Siwré, Senegal, first millennium AD
'Rolled twisted twine roulette' (S. McIntosh *et al*. 1992).

Sincu Bara, Senegal, fourth to tenth, possibly twelfth, centuries AD
'Twisted and rolled twine' (S. McIntosh and Bocoum 2000, fig. 11, top left).

Oursi, Burkina Faso, by at least the mid- to late first millennium AD
'Grobes Schnurroulette', 'Feines Schnurroulette' (von Czerniewicz 2002, e.g. plate 6, top two).

Garumele, Niger, approximately 1400–1850 AD
'Twisted string roulette' (Haour 2008, fig. 5a).

Note

1 Wiesmüller (2001, 144, note 4) has observed that common usage in the literature has led to some technically-inaccurate slippage; what is known as a 'twisted cord roulette' should in fact accurately be called 'twice-twisted', while what has become known as a 'double twisted' refers, in fact, to a roulette that has been twisted three times.

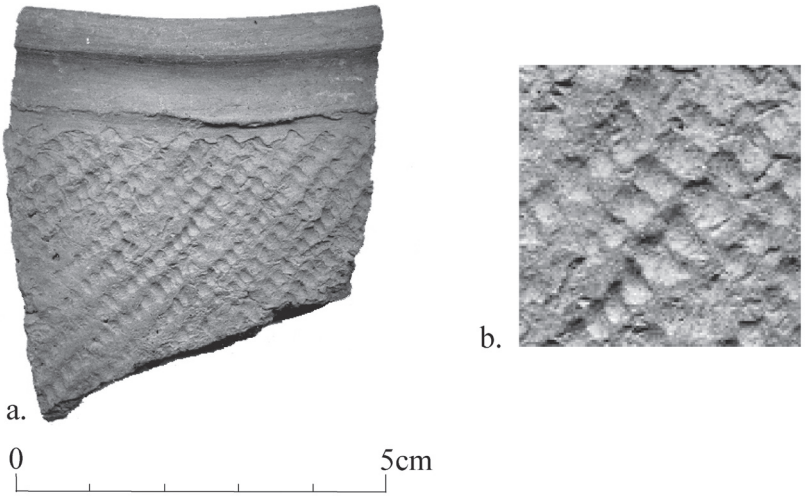

Figure 3.2. Sherd recovered from the surface of Siwré (S1), Senegal, early first millennium AD. The neck bears a single linear impression made by a dragged stylus, underlain by rolled impressions of a twisted cord roulette. Photo: Ndèye Sokhna Guèye.

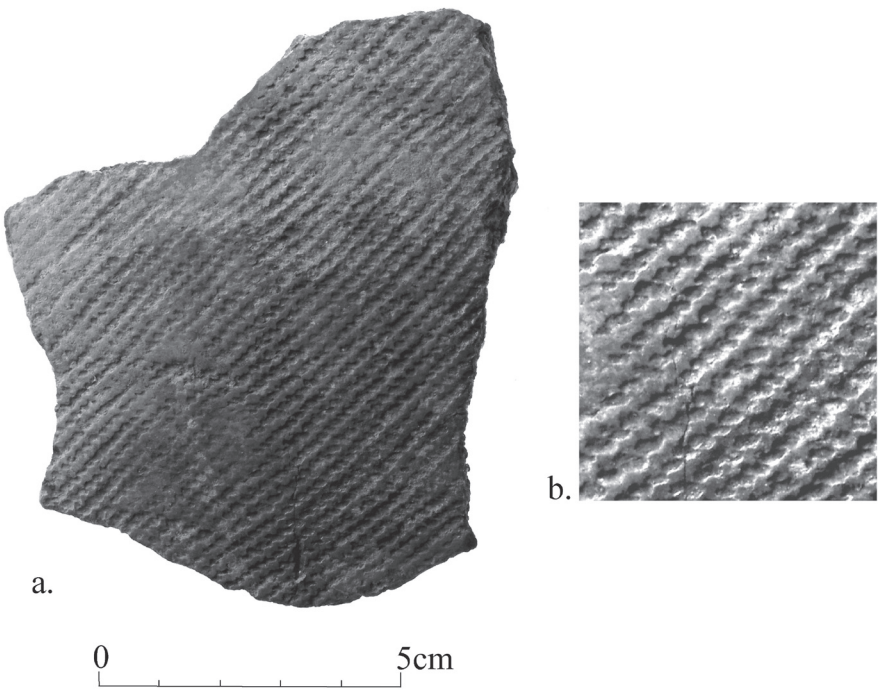

Figure 3.3. Sherd recovered from excavations at Windé Koroji Ouest, Mali, 1700–1000 BC. The body bears rolled impressions of a fine twisted cord roulette. Photo: Kevin MacDonald.

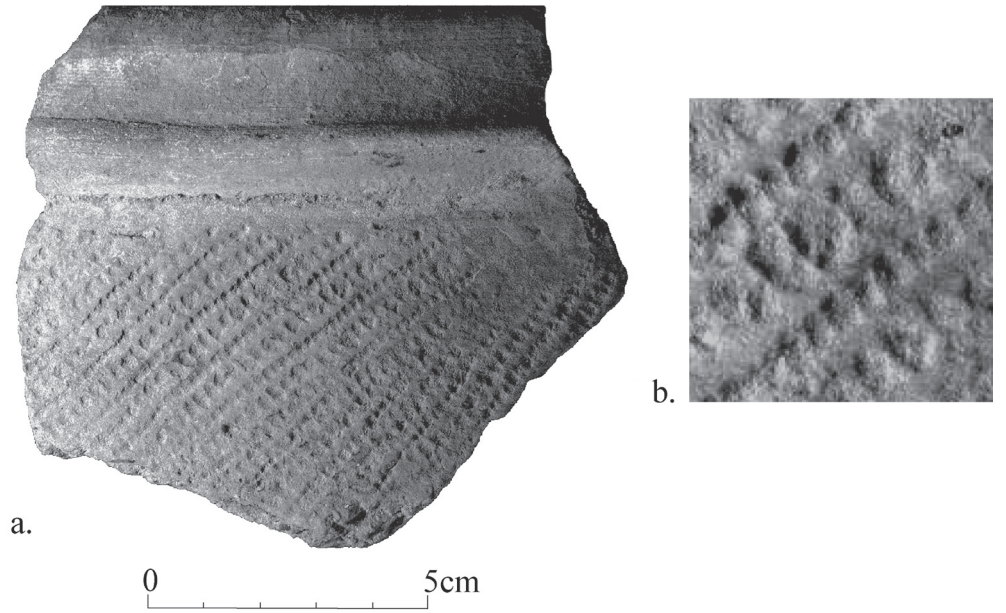

Figure 3.4. Sherd recovered from surface collections at Cubalel, Senegal, early first millennium AD. The upper and mid body bear rolled impressions of a twisted cord roulette which seems comparable to Hurley's Cord 42, involving the wrapping of a supplemental cord around a thicker core cord. Photo: Susan McIntosh.

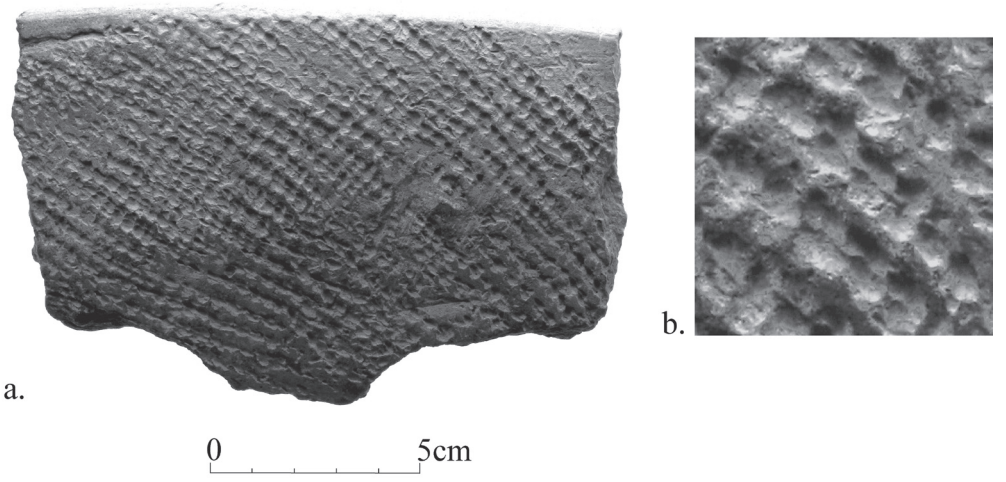

Figure 3.5. Sherd recovered from excavavtions at Kolima-Sud, Mali, ca. 1300–800 BC. The body bears rolled impressions of a double twisted cord roulette. Photo: Kevin MacDonald.

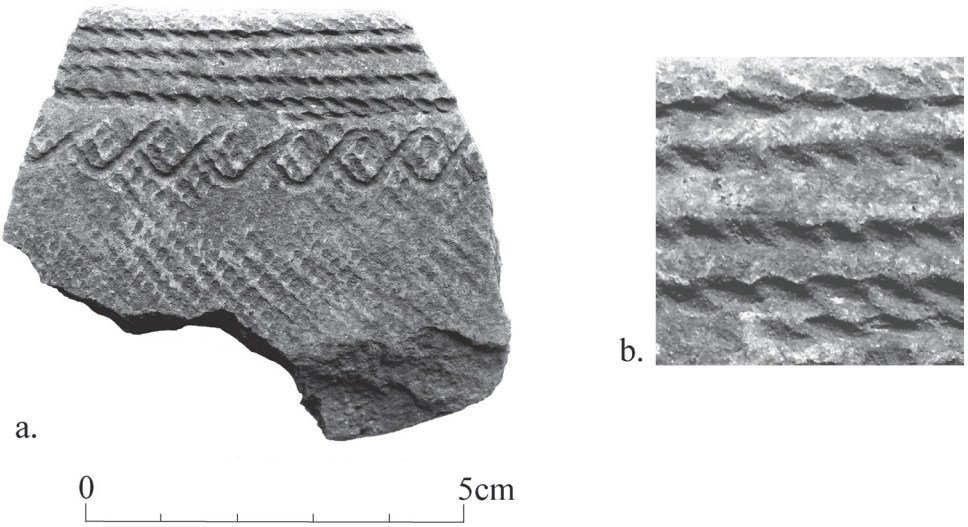

Figure 3.6. Sherd recovered from excavations at Er Negf, Lower Tilemsi Valley Mali, mid- to late third millennium BC. The neck bears impressions of a twisted cord, which has been single-impressed in parallel rows, underlain by a twisted knotted cord roulette. Photo: Katie Manning.

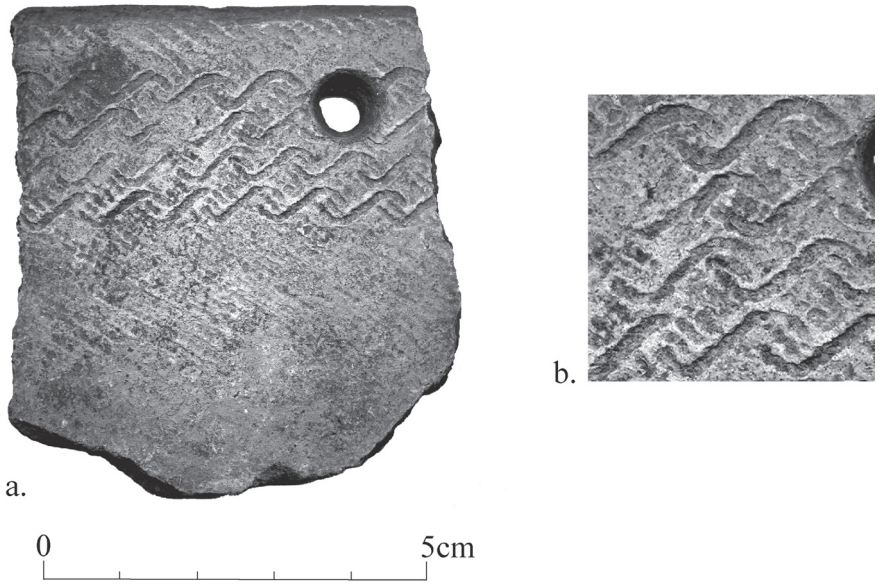

Figure 3.7. Sherd recovered from excavations at Er Negf, Mali, mid- to late third millennium BC. The neck and upper body bear impressions of a twisted knotted cord roulette with four knots added off-centre along the length of the roulette. Photo: Katie Manning.

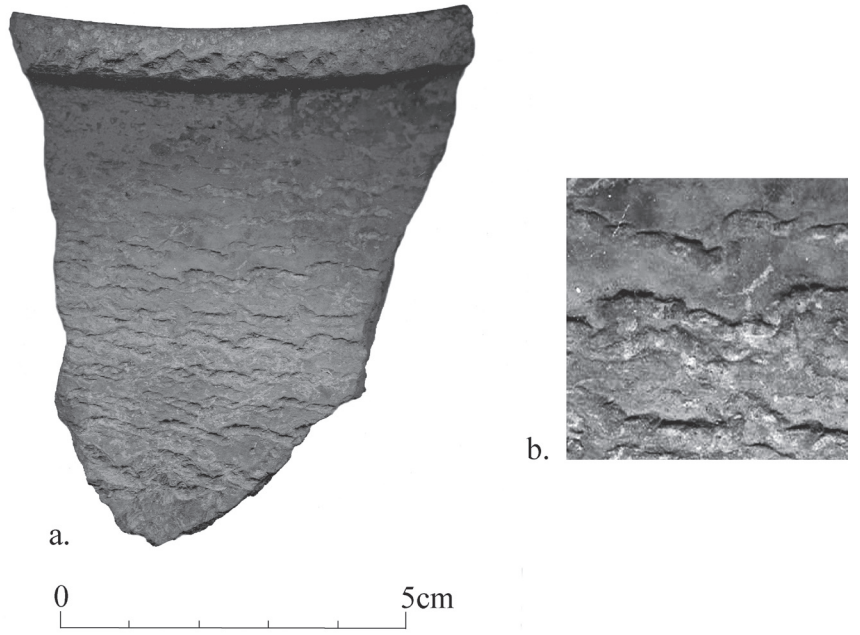

Figure 3.8. Sherd recovered from excavations at Windé Koroji Ouest, Mali, 1700–1000 BC. The neck and upper/mid body bear impressions of a twisted cord roulette with multiple knots (approximately 13). Along the lip are impressions of a twisted cord roulette. Photo: Kevin MacDonald.

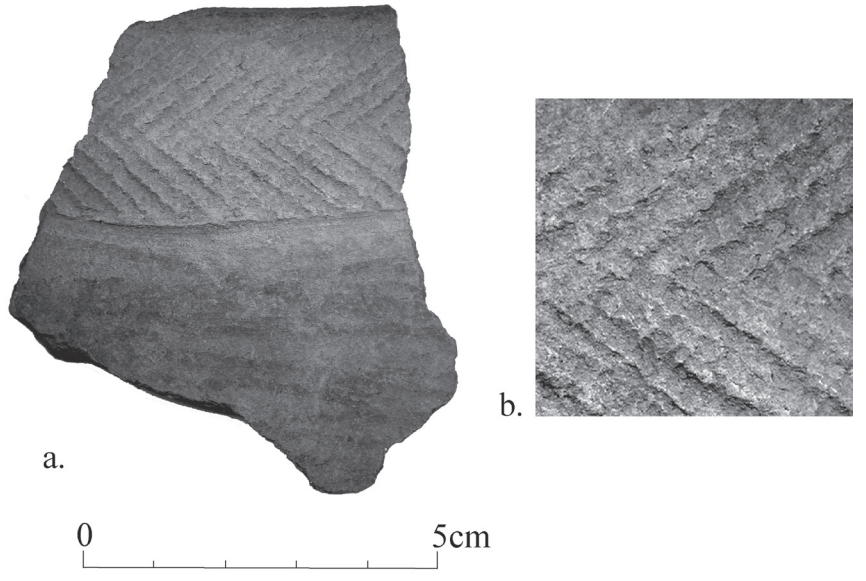

Figure 3.9. Sherd recovered from excavations at Tiboubija, Lower Tilemsi Valley, Mali, mid- to late third millennium BC. The neck bears rolled impressions of a twisted and looped cord roulette, underlain by a single line of dragged stylus. The impression is unlikely to have been made by simply rolling two cords that were twisted in opposite directions as the boundary between the two opposing directions is very clean. Photo: Katie Manning.

Cord-wrapped roulette
Roulette de cordelette enroulée

Kevin MacDonald and Katie Manning

Appearance of the archaeological material

Sherds bearing impressions of rolled cord-wrapped roulettes generally display parallel rows of concave segments resembling rounded grains of rice. The space between each row of segments varies greatly: they can be flush with one another, or set some distance apart. This is a function of how tightly the cord was wrapped around the core of the roulette. Likewise, the angle of the individual segments relative to the row of impressions (which is made in the direction the tool is rolled) may be anything between about 30 to 90 degrees, or equally 270 to 330 degrees, to the horizontal. This is dependent on the angle at which the cord was wrapped, and on the direction of the twist: a left to right twist will result in an angle between about 30 and 90 degrees, while a left to right twist will result in an angle of between 270 to 330 degrees.

Depending on whether a flexible or rigid core has been used, and on how deeply the tool was impressed, sherds will sometimes feature lines running perpendicular to the long, parallel rows of cord impressions (Figure 3.13): these perpendicular lines represent the central core of the tool. Alternatively, a roulette involving a cord-wrapped cord core will sometimes feature a degree of 'background noise' (Figure 1.18), the underlying cord core leaving additional impressions. Similarly, the extremity of the core (be it the looped end of a cord, or the unwrapped end of a stick) can sometimes be detected at the edge of the rolled pattern.

If a cord made up of multiple twisted strands is used as the wrap, the raised edges of the two individual strands disguise the normal parallel run of the individual segments; resulting instead in a field of interlocking ovals, or beads (Figures 3.11 and 3.14). Cords may also be counter-wrapped to create a series of criss-cross impressions (Figure 3.15; also Figures 1.30 and 1.31). These impressions are similar to nets and to composite braided cord roulettes, and confusion is possible with both (see below, and S. McIntosh and Guèye, this volume). Alternatively, if a rigid core is being used, it can be split, and cords wrapped in overlapping and contrasting directions, to create a diverse array of impressions (see below and Figure 3.19).

The above descriptions hold true of cord-wrapped roulettes that have been rolled. However, other applications are possible. Cord-wrapped roulettes are frequently used to make single impressions, often arranged in patterns (typically rows) (Figures 3.16 and 3.20), or used as pivoting tools, mimicking the effect of potters' combs (Figure 3.17).

Description of the tool

Cord-wrapped roulettes are composite tools (following Soper 1985, 39), which consist of a central core (which can be either flexible or rigid) around which are wrapped one or more cords (either twisted or untwisted). As was discussed in Section 1 (this volume), the ethnographic record suggests that a useful further classification may involve discriminating between tools on a continuous core, and tools on an independent core. Ethnographically speaking, it seems that most cord-wrapped cords involve a single, continuous cord, doubled back on itself to serve both as a core and as a wrap. However, this distinction is not detectable archaeologically.

Cord-wrapped roulettes are conceptually very similar to composite braided cord roulettes (see S. McIntosh and Guèye, this volume) – but whereas composite braided cord roulettes involve the *braiding* of cord around a core, the category discussed here involves the *wrapping* of a cord around a core.

Unmodified central core

The most basic cord-wrapped roulette is made by wrapping loose or twisted fibres (most commonly the latter, in the shape of a cord) around a core. Such cores can be either rigid (e.g. a stick or a rod of bone, as shown in Figures 3.10 and 3.11, or metal nails or rods, see e.g. Figure 1.27) or flexible (e.g. a cord, as shown in Figure 1.18). The fibres or cord may be wrapped tightly around the core, or space may be left between each revolution of the wrapping; this will determine the spacing between each line of segments. This contrast can be seen, for example, by considering Figures 3.12 and 3.18. In the first case, a contiguously-wrapped untwisted cord (resulting in no distinct segments) has created a dense field of overlapping lines, whereas in the second the cord has been loosely wrapped around the core so that each line of segments is clearly separated. Another variable affecting impressions is the angle at which the wrapping has been set in relation to the core (see above). If the wrapped cord is widely spaced, the angle of the individual segments will be decreased in relation to the horizontal (i.e. the line along which the tool is being rolled). In contrast, if the wrapped cord is more tightly spaced the angle of the individual segments will be increased.

An alternative form of the unmodified core is the looped counter-wrapped cord. This tool comprises a core cord and supplementary cords; the end of the overlying cord is looped through the extremity of the core cord, and then wrapped counter to the direction of the core cord's twist (see Figure 1.17). This would be called a 'composite' tool in Soper's terminology (1985), as it consists of two distinct elements. However, as both the central core and the wrapping are one and the same length of cord, it can equally be classed as a cord on a continuous core (see Section 1, this volume). Hurley (1979) provides a detailed overview of the potential range of looped cord-wrapped cords, and some of their impressions bear striking similarity to those of a counter-wrapped split stick (see below, and Figure 3.1). However, in the case of a looped counter-wrapped cord roulette the core is formed by a cord (as opposed to a stick), and as a result its impression leaves a certain amount of background noise underneath the criss-cross impressions (see Hurley 1979, Cord 204/205 and Cords 255–260). Nonetheless, this background noise can easily erode through time, making these two tools easily confused.

Split stick core

By splitting the rigid core of a cord-wrapped roulette, innumerable variations are created in the direction and angle of overlapping cords, resulting in a diverse array of impressions. In the archaeological record of West Africa, the most commonly encountered cord-wrapped split stick tools appear to be of two kinds: those made by counter-wrapping of the cord, and those made by overlapping cords at contrasting angles.

Counter-wrapped cord roulettes are made by wrapping a length of cord around a stick that has been split at either end (or down its length) then looping the cord at the extremity of the stick, and passing it through the split and over the initial wraps, slanting in the opposite direction. This creates a series of X's in a criss-cross design, akin to net impressions (Figure 3.15).

Another variant of the split stick tools consists of a form of overlapping cords, described by Hurley (1979) as Cords 249–252. In this case, a cord is wrapped around a rigid core, then tucked into the split at the extremity of the core, and wrapped around the length of the core, finally being secured at its opposite end. The rolled impression of this tool creates distinct zones of parallel rows of cord impressions, divided by a single oblique or perpendicular cord impression (Figure 3.1). These tools are akin to the looped counter-wrapped cord described above, illustrated in Figure 1.17.

Multiple stick core

Cord-wrapped roulettes can also be constructed using multiple rigid cores. Supplementary cord is then wrapped around and between these cores. As noted by Hurley (1979, 104), "A characteristic of multiple-stick cord impressions is the gap between the vertical rows, which give the effect of basketry" (see also Section 1, this volume). Multiple-stick-wrapped roulettes are poorly known in the West African archaeological record, although they were evidently in use, for example at Jenné-jeno where a three-stick cord-wrapped roulette has been identified (Figure 3.19); they are also evidenced ethnographically (Figures 1.29 and 1.30).

Terminology and distribution

Conflicting hypotheses exist regarding the time-depth of cord-wrapped roulettes. They could be amongst the first cord-based decorative tools used in Africa, perhaps as early as ten thousand years ago. Alternatively, they may represent, as suggested by Livingstone Smith (2007), a much later phenomenon, as part of a flowering of cord-based roulettes centred on the Middle Niger Basin from the third millennium BC onwards.

Cord-wrapped roulettes have been very unevenly described, some authors seemingly choosing not to distinguish single-impressed or pivoted cord-wrapped roulettes from impressed or pivoted comb (see Introduction, this volume; Caneva 1983), whilst others have been more determined to reconstruct and identify these tools (Camps-Fabrer 1966). Problems in identification notwithstanding, it does seem that cord-wrapped roulettes, despite their relative complexity of construction, occur in the earliest ceramic

assemblages of Africa, which are in turn some of the earliest in the world (see Huysecom *et al.* 2009). They appear to be present, for instance, at the site of Tagalagal (Niger), around 8800–8400 BC (Roset 1983, fig. 7, lower right-hand specimen). Roset (1983, 125) is at pains to stress that at Tagalagal cord-wrapped roulettes were both single impressed and rolled:

> "*…le peigne fileté souple n'est pas uniquement utilisé comme nous venons de voir, par impression profonde dans la pâte. Il peut également être roulé sous le doigt sur la surface du vase, où il laisse alors une empreinte régulière faite de petit sillons à peine marqués et parfaitement parallèles*".

The early occurrence of cord-wrapped roulettes at Tagalagal appears not to be an isolated instance. The well-documented site of Amekni (southern Algeria) provides comparable examples, spanning a period between 8000 and 4000 BC (Camps and Camps 1968; Camps 1974). There, decorations made using a 'peigne fileté souple' or 'peigne fileté rigide', as cord-wrapped roulettes are called by these authors, occur throughout the site's long stratified sequence, comprising 11.3% of motifs in the earliest levels and decreasing to 9.3% by the site's abandonment (Camps and Camps 1968, 134). Flexible cores were differentiated from rigid cores in impressions by the occurrence of undulations pointing to the use of a flexible core. Indeed, cord-wrapped roulettes with a flexible core were more common at the site than were those with a rigid core, particularly so in the earliest layers. Cord-wrapped roulettes were also sometimes rolled at Amekni: the text calls these motifs 'sillons d'impression' (Camps and Camps 1968, 128–129) and some compelling photos (see Camps and Camps 1968, 135: photos 3 and 4; 138) are included. Elsewhere, 'peigne fileté' occurs widely in the early ceramics of the Hoggar (Algeria). In his synthesis on the Téfedest Central, Maître (1971, 54) notes that 'peigne fileté' is most common in early periods (the *Néolithique de Tradition Soudanaise* and the *Bovidien*), when it accounts for 15 to 20% of decoration types. In subsequent periods (the *Idélésien* and the *Caballin*), the proportion decreases to just 5% approximately. Meanwhile, just to the south of the Hoggar, at the sites of Hassi el Abiod in the Malian Sahara of the Taoudenni Basin, Commelin (1983) also identifies cord-wrapped roulettes, in this case apparently single-impressed rather than rolled.

Along the Nile, cord-wrapped roulettes may well be present at an early date, but there exists no agreement about the nature and usage of the tools employed. In his seminal monograph *Early Khartoum*, Arkell (1949, 87) noted concerning the pottery of the Early Settlement (tenth-ninth millenna BC approximately) that "in general the method was to produce the appearance of basketwork by impressions made in the clay with fairly fine cord or twine." When one consults the very clear photos of some of the sherds concerned, it is readily apparent that we are dealing with cord-wrapped roulettes of some type, with only one potentially rolled example amongst several single impressed and rocked examples (Arkell 1949, Plate 76). By the same token, Hays (1974, table 1), in his re-analysis of the 'wavy line' pottery of Khartoum, the Second Cataract and Dongola Reach, characterises the majority as being decorated with either 'woven mat' or 'linear mat'. In this case it is apparent that Hays, like Arkell, confused a good deal of comb-impressed pottery with 'mat impressed' pottery (see for example Arkell 1949, 89 and Plate 81). Cord-wrapped roulettes were therefore probably common at Early Khartoum; whether on combs or bracelets as Livingstone Smith (2007, 193) asserts,

or wrapped around cylindrical cores. It is therefore all the more confusing that cord-wrapped roulettes go unmentioned in some recent re-appraisals of Nilotic pottery from this period (Caneva 1983; Caneva and Marks 1990).

By the mid-third millennium BC, despite their seeming absence in the 'Tenerian' of central Niger (Garcea 2008), the use of cord-wrapped roulettes in the western Sahara and the Sahel appears to increase quite dramatically. In Lower Tilemsi Valley occupation layers dated from about 2600–2200 BC, fibre roulettes dominate the suite of decorative tools, with cord-wrapped roulettes – both single-impressed and rolled – accounting for over a third of all motifs (Manning 2008). From this point onwards, cord-wrapped roulettes rapidly proliferate southwards and westwards: they appear in 'Pre-Tichitt' assemblages (Mauritania) from 2300 BC (MacDonald *et al.* 2009), occur in the Malian Gourma region by 2100 BC (at Windé Koroji; MacDonald 1996), and at Ounjougou (Bandiagara, Mali) in the second millennium BC (Huysecom *et al.* 2004). They are common in Tichitt Tradition assemblages of Mauritania from *ca*. 1600 BC (Munson 1971; MacDonald *et al.* 2009), and are present in the Malian Méma region (at Kolima-Sud, Kobadi and other sites) by at least 1300 BC (MacDonald 1994).

Further to the south, in savanna-forest zones, the full range of cord-wrapped roulette motifs (single-impressed and rolled) are documented at the Boase sites in Ghana (Watson 2005) and at Fanfannyégèné I in Mali (Huysecom 1990) during the second millennium BC. They continue to occur in the Middle Niger, particularly in the earlier layers (first millennia BC to AD 400) of early urban sites such as Dia (Schmidt *et al.* 2005) and Jenné-jeno (S. McIntosh 1995). In the first millennium AD assemblages of the Méma region, at Akumbu and other sites, cord-wrapped roulettes made with untwisted fibres are particularly common (Togola 2008). Elsewhere across the Sahel, they persist into the historic period (Wiesmüller 2001; Nixon 2008; 2009).

At our current state of evidence, we are therefore left with three different hypotheses concerning the origins and distribution of cord-wrapped roulettes:

1 cord-wrapped roulettes (whether single-impressed or rolled) occurred on the earliest of African ceramics, both in the Central Sahara and the Nile, dwindled in popularity over time, and re-emerged strongly with a radiation from the West African Sahara in the third millennium BC
2 cord-wrapped roulettes occurred only in the early ceramics (*ca*. 9000 to 6000 BC) of southern Algeria and central Niger, and persisted locally until they expanded considerably in their distribution during the third millennium BC
3 cord-wrapped roulettes are illusory prior to the third millennium BC in south-eastern Mauritania and the Middle Niger Basin; early examples all derive from cord-wrapped comb stamps or 'bracelets,' rather than cord-wrapped cylindrical cores.

Selected archaeological instances

Tagalagal, Aïr Massif, Niger, 8800–8400 BC
'Peigne fileté souple', 'Peigne fileté souple roulé' (Roset 1983).

Amekni, Hoggar Massif, Algeria, 8000–4000 BC
'Peigne fileté souple' and possibly r'Sillons d'impression des peignes filetés souples'. Both flexible and rigid cores are evidenced (Camps and Camps 1968).

Hassi el Abiod sites, Taoudenni Basin, Mali, 7500–4000 BC
'Peigne fileté rigide et souple'. Both flexible and rigid cores are evidenced (Commelin 1983).

Lower Tilemsi Valley (Karkarichinkat Nord, Ebelelit, Tiboubija, Er Negf, Tin Alhar and Jsmagamag), Mali, 2600–2000 BC
Rolled ('PFR0–6'), single-impressed ('PFI0–4') and rocked ('PFV') cord-wrapped roulettes, with both flexible and rigid cores, as well as an overlapping cord with split stick core ('PFR7') (Manning 2008).

Windé Koroji, Gourma, Mali, 2100–1100 BC
Single-impressed ('ICS') and rolled ('CSR') cord-wrapped roulettes (MacDonald 1996).

Bou Bteiah and Djiganyai, Dhar Néma, Mauritania, 1900–900 BC
'Single-impressed and rolled cord-wrapped roulettes' (MacDonald *et al.* 2009).

Kolima-Sud, Kobadi and other sites, Méma, Mali, 1400–1100 BC
Single-impressed ('ICS/PFS') and rolled ('CSR') cord-wrapped roulettes with both rigid and flexible cores (MacDonald 1994).

Boase sites, Kintampo area, Ghana, 1600–1400 BC
'Peigne fileté souple' (Watson 2005, figs 6 and 7).

Fanfannyégèné I, Mali, early first millennium BC
'Peigne fileté' (Huysecom 1990).

Dia, Mali, from 800 BC into the first millennium AD
Single-impressed ('PFI') and rolled ('PFR') cord-wrapped roulettes with unmodified core and multiple stick core ('PFR-3'), counter cord-wrapped stick ('PFR-5') (Schmidt *et al.* 2005, fig. 7.1.7).

Jenné-jeno, Mali, Phase I/II 250 BC–AD 400
Cord-wrapped stick with untwisted cord and unmodified core ('Twine 14'), looped counter-wrapped cords ('Twines 8 and 9'), single-impressed cord-wrapped roulettes and rolled multiple-stick cord-wrapped roulette (S. McIntosh 1995, plate 13).

Promontoire d'Ounjougou, Bandiagara Plateau, Mali, mid- to late first millennium AD
'Counter-wrapped cord roulette' (Mayor *et al.* 2005, fig. 4).

Akumbu and contemporary survey sites, Méma region, Mali, AD 400–1400
Cord-wrapped stick with untwisted cord ('Twine 14') (Togola 2008).

Essouk, Mali, AD 750–1400
'Cord wrapped stick grid impression' (Nixon 2008; 2009).

Ndufu, Kursakata and Mege, Chad basin, Nigeria, 1000–500 BC (Type 1) and early first millennium AD – present ('Type 2')
'Schnur-umwickeltes stabroulette' ('CWR type 1'), 'Schnur-umwickeltes Stabroulette mit Lücke' ('CWR type 2'), 'mit gekreuzter umwickeltes Stabroulette', 'mit gegenläufiger Schnur umwickeltes Schnurroulette in eine Richtung' (Wiesmüller 2001: figs 42a.1a–f, 42b.1a–f).

Sources of confusion

Cord-wrapped roulettes that have been rolled are usually relatively easy to recognise, the most notable diagnostic being the angle of each segment relative to the run of the roulette. Unlike twisted cord roulettes, which will produce oblique rows of cord impressions with segments angled perpendicular to the row, a rolled cord-wrapped roulette, if wrapped in a single-strand cord, will produce parallel rows of cord impressions with the segments set at an angle that is always less than 90 degrees (or greater than 270 degrees, depending on the direction of the twist) to the horizontal core. Another striking diagnostic of cord-wrapped roulettes employing a rigid core is that stick marks are sometimes visible perpendicular to the row of cord impressions (Figure 3.13).

However, a clear difficulty lies in the sheer number of manipulations that are possible with cord-wrapped roulettes. Some potential sources of confusion are the use of multiple-strand cords around cores (which produces a field of interlocking ovals without apparent orientation; see Figures 3.11 and 3.14) or the 'net-like' appearance produced by counter-wrapped split stick cores (see Figure 3.15). The former, though it may initially be confused with a twisted cord roulette impression, is relatively easy to recognise once one knows what pattern to look for. The latter may be confused with net-impressed pottery (this volume, Section 1), but it is differentiated by the occurrence of stick marks, repeats in the pattern (this volume, Section 2), and the general regularity of the split stick roulette. Another source of potential confusion may be with pivoted comb, which involves almost 'vibrated' horizontal rows of comb impressions. The best way to differentiate cord-wrapped roulettes in this case is to look for fibre imprints within the individual segments of the impression; if these are not present, then doubt is warranted.

Differentiating the impressions of single-impressed cord-wrapped roulettes or rolled multiple-stick cord-wrapped roulettes from those of mats or stamped combs is a more complex matter. Camps-Fabrer (1966, 446–447) has noted that mat impressions are generally shallower and less marked than those of single-impressed cord-wrapped roulettes (Figure 3.16, for example, shows the deep impressions typical of a single-impressed cord-wrapped roulette). Likewise, each revolution of a cord-wrapped roulette

will generally not be equal, due to factors such as the pressure and speed of rolling, as well as varying amounts of adhering wet clay. This irregularity will be duplicated in each individual impression; mats, in contrast, are rather more regular in their impressions. To this one may add that core or stick marks are often visible between the wraps of a cord-wrapped roulette.

Regarding comb-stamping, Camps-Fabrer (1966) observed that comb impressions are generally more rectilinear in form, whereas the segments of a cord-wrapped roulette tend towards the oval. The presence of fibre imprints within impressions, as noted above, is another diagnostic criterion (especially as the deep furrows are usually the last portion to erode). In contrast, the tooth of a comb will normally leave a clean mark. Additionally, potters' combs usually make more distinct and deeper impressions. Flexibility is another issue to consider: potters' combs of wood or bone do not bend, while cord-wrapped roulettes with flexible cores bend easily. This curvature is often visible in impressed or pivoted cord-wrapped impressions.

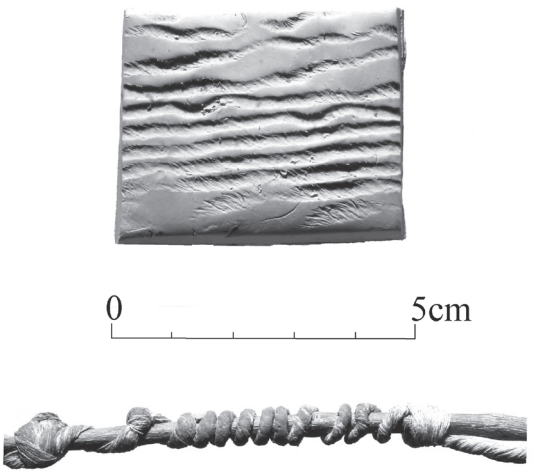

Figure 3.10. Experimental tool and impression of a simple twisted cord-wrapped stick (similarvto the tool used to make the impression shown in Figure 3.12 below). Photo: Kevin MacDonald.

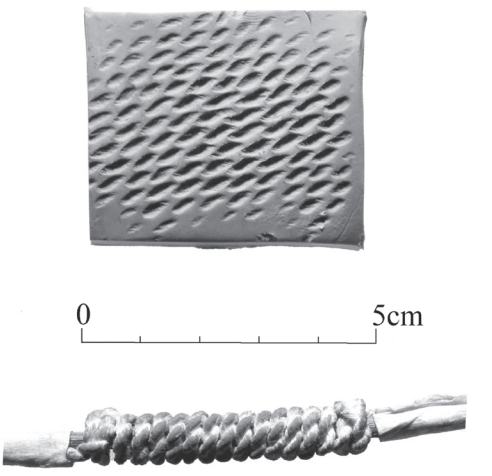

Figure 3.11. Experimental tool and impression of a double twisted cord wrapped stick (similar to the tool used to make the impression shown in Figure 3.14 below). Photo: Kevin MacDonald.

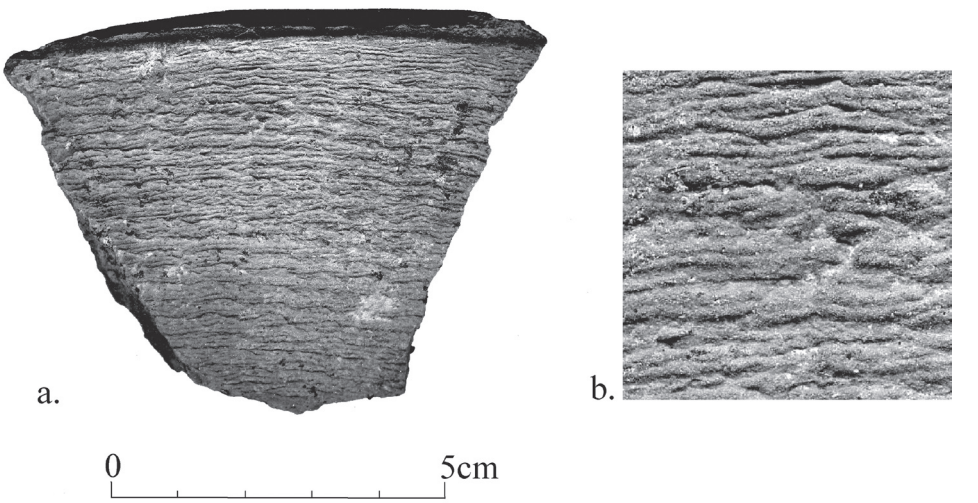

Figure 3.12. Sherd recovered from excavations at Jenné-jeno, Mali, Late Phase II/early III, early first millennium AD. The body bears impressions of a rolled cord-wrapped stick with untwisted fibre (comparable to Hurley 1979, cord 215 and Figure 3.10 above). Photo: Susan McIntosh.

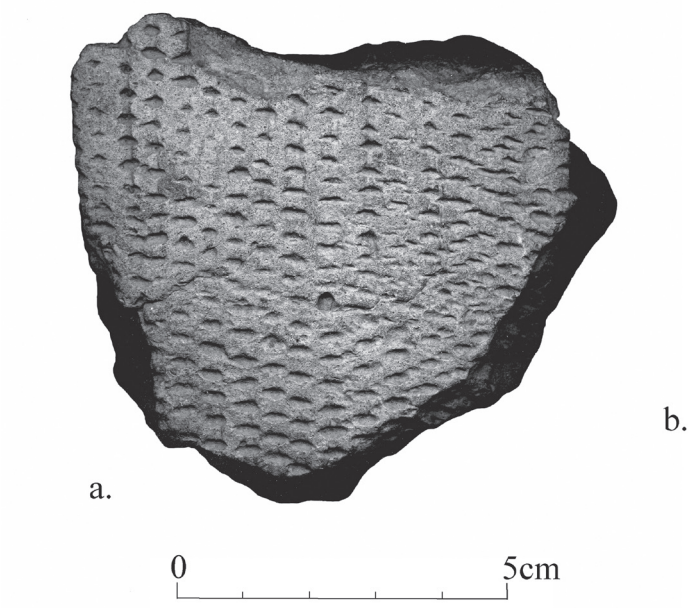

Figure 3.13. Sherd recovered from Kobadi, Mali, second millennium BC. The body bears impressions of an impressed (flipped) cord-wrapped stick, showing clear stick marks running vertically over the surface. Photo: Kevin MacDonald.

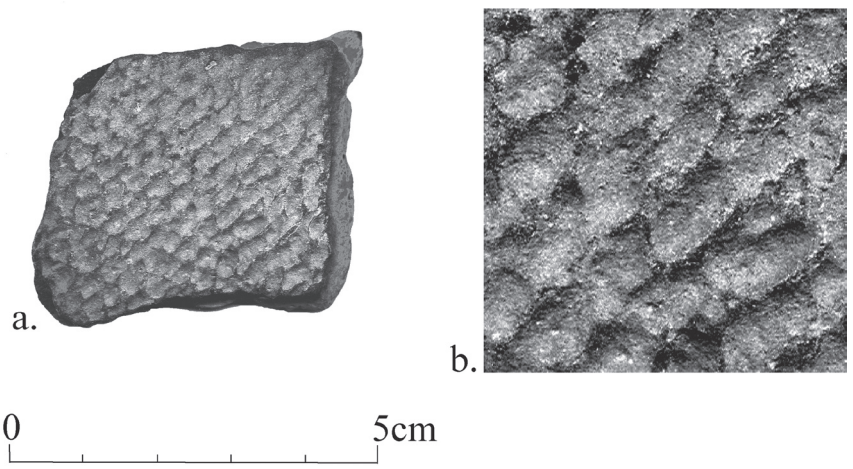

Figure 3.14. Sherd recovered from Kobadi, Mali, second millennium BC. The body bears impressions of a rolled cord-wrapped stick with multiple twisted cord (inter-locking ovals). Photo: Kevin MacDonald.

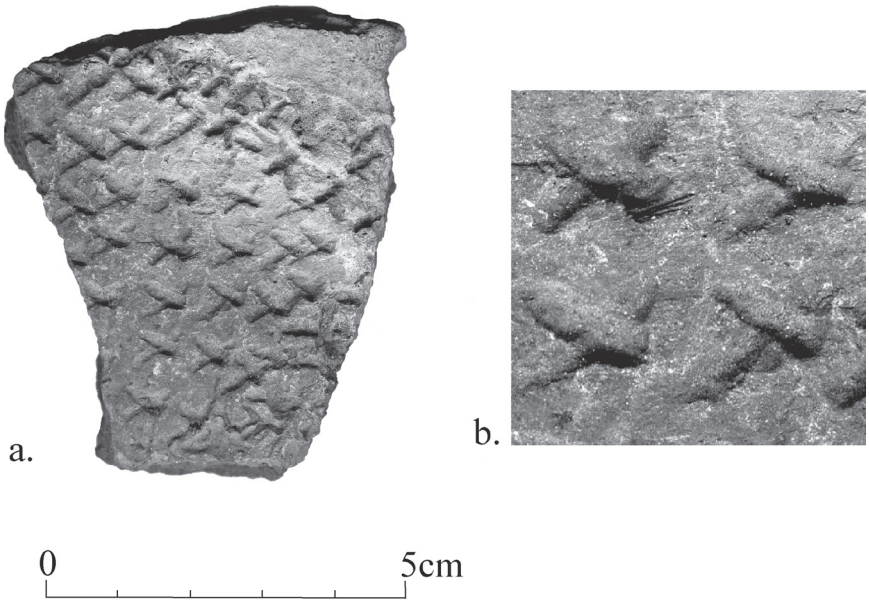

Figure 3.15. Sherd recovered from excavations at Walaldé, Middle Senegal Valley, Senegal, mid-first millennium BC. The body bears impressions of an impressed counter-wrapped cord-wrapped stick. Photo: Susan McIntosh.

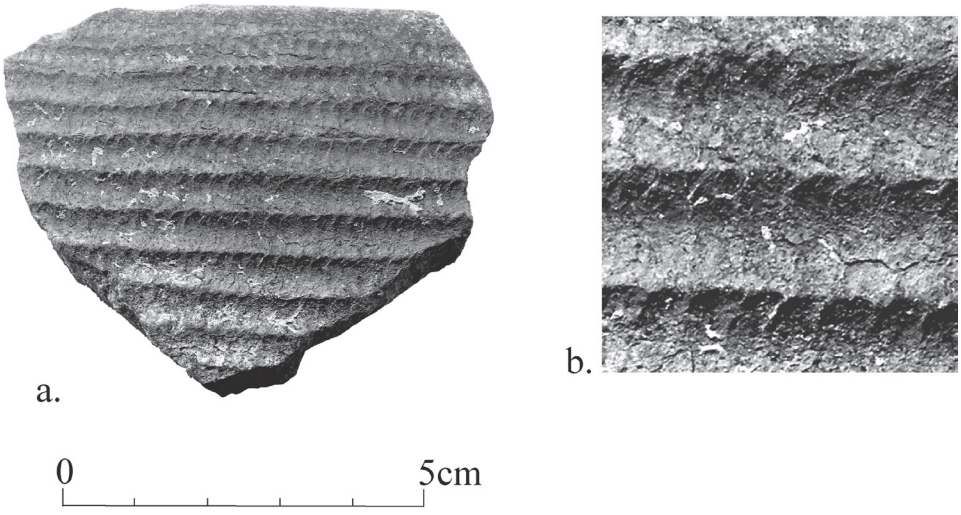

Figure 3.16. Sherd recovered from excavations at Karkarichinkat Nord, Mali, mid-third millennium BC. The upper body bears impressions of an impressed double twisted cord-wrapped roulette (cord-wrapped cord or cord-wrapped stick). Photo: Katie Manning.

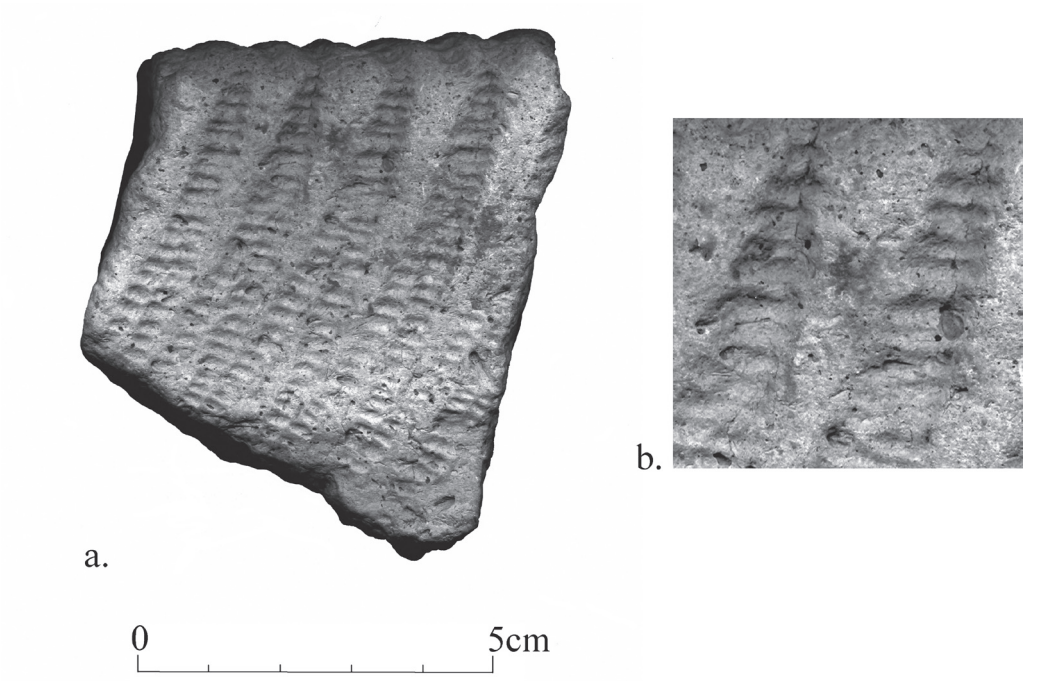

Figure 3.17. Sherd recovered from excavations at Kolima-Sud, Mali, late second millennium BC. The neck and upper body bear impressions of a rocker-impressed cord-wrapped roulette. Photo: Kevin MacDonald.

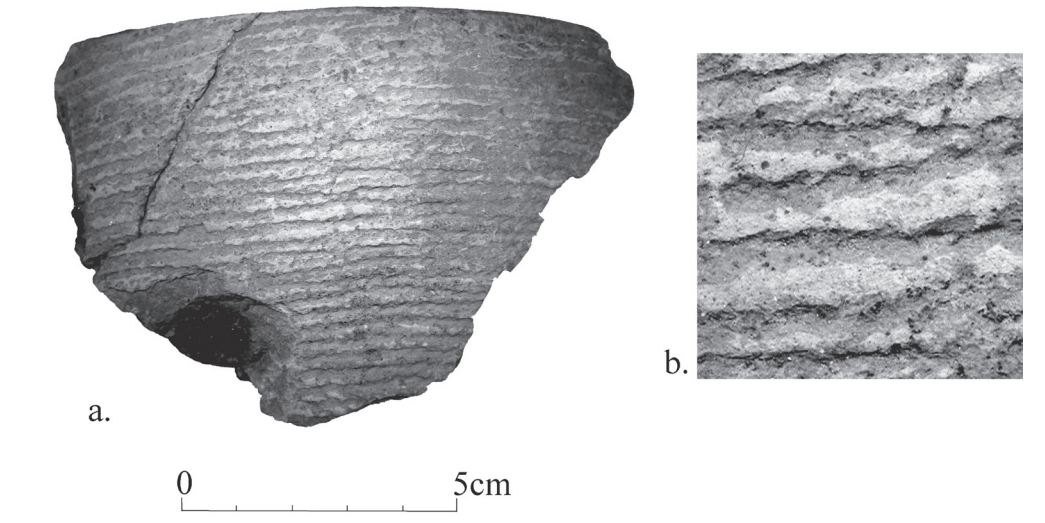

Figure 3.18. Sherd recovered from excavations at Windé Koroji Ouest Tumulus, Mali, early first millennium BC. The neck and upper body bear impressions of a rolled cord-wrapped roulette (cord-wrapped stick or cord-wrapped cord). Photo: Kevin MacDonald.

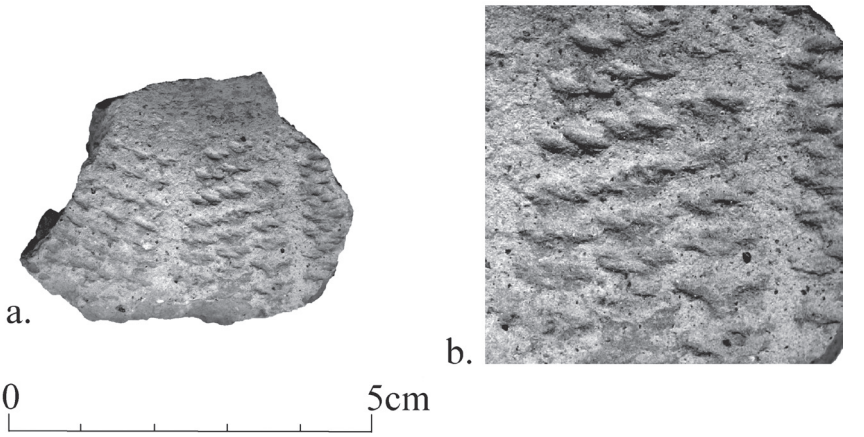

Figure 3.19. Sherd recovered from excavations at Jenné-jeno, Mali, Phase III, AD 400–900. The body bears impressions of a rolled multiple-core cord-wrapped stick. Photo: Susan McIntosh.

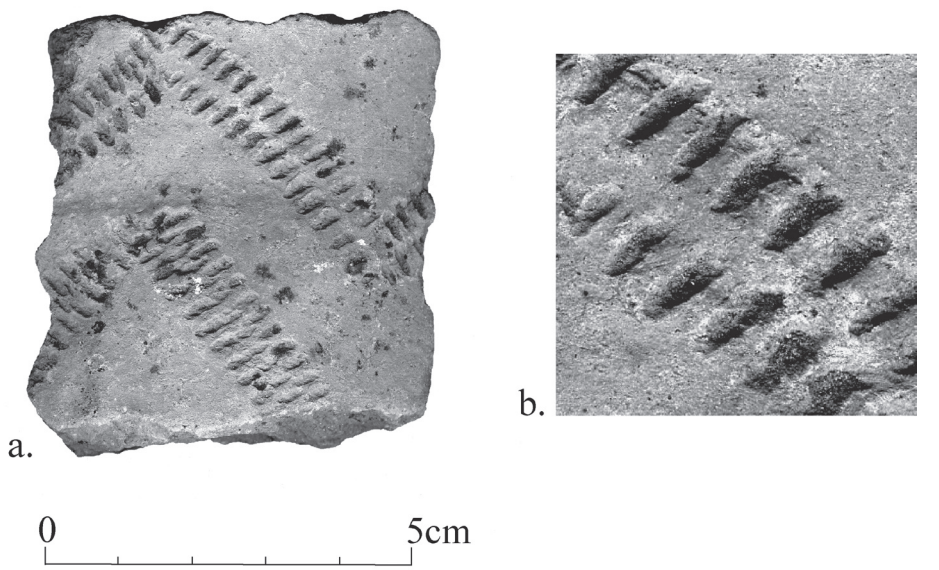

Figure 3.20. Sherd recovered from excavations at Walaldé, Middle Senegal Valley, mid-first millennium BC. The body bears impressions of an impressed cord-wrapped stick. Photo: Susan McIntosh.

Braided cord roulette (simple and composite)
Roulette de cordelette tressée (simple et composite)

Susan McIntosh and Ndèye Sokhna Guèye

Appearance of the archaeological material

Sherds bearing impressions of a rolled braided cord roulette generally display a repeating succession of broken zigzags resembling rows of offset chevrons. Depending on the thickness of the cord used, the braiding pattern, and the presence or absence of a central core (which may be flexible, such as a cord, or rigid, such as a stick) around which the braid was created, the chevron effect may be subtle or extremely pronounced. Certain variants look distinctly woven, as if created by a net or textile.

Description of the tool

The tool producing this decoration is made from three, four, eight or twelve cords braided together, with or without a central core. As far as is known, braided cords are always rolled, as opposed to being single-impressed, across the surface of the clay.

Some braided roulettes consist of simple braided cords; others are composite cord-on-cord or cord-on-stick roulettes. The distinction between simple and composite roulettes follows Soper (1985, 39; and Section 1, this volume). Composite braided cord roulettes are conceptually similar to cord-wrapped roulettes (see MacDonald and Manning, this volume), but they differ in the action of weaving the cord around the core by braiding, rather than winding it one or more times (wrapping and counter-wrapping). In other words, in the case of composite braided cord roulettes the acting part is the *braid* itself. Braided motifs that have spaces between individual cord impressions may be confidently attributed to composite braided roulettes. Tightly-braided motifs in which the cords are closely adjacent, giving the impression of woven cloth, were likely produced by simple braid roulettes, although an almost identical effect is produced if a central cord with a small diameter is used, and the braid tightly woven around it. The following sub-divisions of braided cord roulettes have been recognised as a result of experimental work by one of the authors (S. McIntosh).

Three- or four-cord braid: simple and composite

A common simple braid roulette is made with four cords, woven in an 'under 2, over 1' pattern. That is to say, the top cord is passed under two cords, and then back over one of them. The resulting motif is closely spaced and looks like woven cloth, with

segments meeting at right angles. Each cord meets, and goes under or over, a single cord perpendicular to it (Figure 3.21). A three-cord braid is less common – perhaps because it is more difficult to roll, being flat. The greater the width, the harder it is to roll with the fingers or palm. Small three-cord braids resemble four-cord braids, except that the cord impressions meet at an oblique angle, rather than a right angle. Also, each cord meets, and goes under or over, two cords. Hurley (1979, 85) claims that his motif number 210 was produced with two cords, but our experiments revealed it is not possible to produce any braid using only two cords (two cords can be twisted but not woven, unless they are folded in half to make four elements for braiding); indeed his illustration looks like a three-cord braid (compare with Figure 3.22).

A more open chevron effect can be achieved by braiding four cords around a central cord or stick. The angle of the cords becomes more oblique (Figure 3.23). A composite roulette created with a three-cord braid has parallel cords which pass over two cords in succession and under just one. This is not a pattern commonly encountered.

Doubled four-cord braid: simple and composite

By doubling each cord and braiding in the same manner as above, a double-weave pattern is produced. The cords meet at nearly right angles when the roulette involved is a simple braid, but become more oblique when braided around a central cord or stick. Hurley's cord number 211 (1979, 85) appears to be a doubled four-cord braid, although he claims it is a three-cord braid. It in fact appears to be a variant of his number 212 (1979, 87), which is unambiguously a doubled four-cord braid.

Eight-cord braid: simple and composite

A simple eight-cord roulette is made by braiding eight cords in an 'under 5 and over 2' pattern. Cord impressions meet at an oblique angle, and each cord meets and goes under or over two cords. When braided around a central cord or stick, the resulting rolled impression forms deep chevrons. Bedaux *et al.* (1978, fig. 27, 3) illustrate what appears to be an eight-cord braid that was part of a modern potter's tool kit in the Inland Niger Delta, Mali. An eight-cord simple braid produces a pattern very similar to a three-cord braid and is much easier to manipulate as a roulette, leading us to propose that most simple roulettes fitting the description for the three-cord braid were probably created using an eight-cord braid. Perhaps counter-intuitively, a six-cord braid (such as that illustrated by Bedaux *et al*. 1978, fig. 28, 2) could not be made to produce a weave of uniform length chevrons, regardless of the braid pattern used ('under 3 and over 1', 'under 4 and over 2', 'under 5 and over 3'). In every case, a row of longer chevrons alternates with a row of shorter ones.

Twelve-cord braid: composite

This braid is almost invariably created around a central cord or stick, passing the uppermost cord on either side 'under 8 and over 3'. The resulting motif features deep, long chevrons. Each cord impression meets, and goes under or over, three cords.

Characteristically, the pattern produced has three clean zig-zags (down-up-down) but the fourth (up) has a network of criss-crossing cords – visible in Figure 3.26.

Terminology and distribution

Terminology relating to this decorative motif was initially very general: Szumowski's 'undulating line' (called *barakalé* by his Inland Niger Delta potter-informant) was primarily braided cord roulette, but to judge from his illustrated sherds, it also included undulating motifs created by incision and by a rolled alternately-braided strip roulette (1956a, 37; 1956b, 20; see Mayor, this volume). Other terms include Thilmans and Ravisé's (1983) '*impressions cordées en chevrons tressé alterne*', '*impressionnée à décor de chevrons*' and *'diagonal tissé croisé'* (Treinen-Claustre 1982, 50, 103) and the commonly used 'braided twine' (*cordelette tressée*) and 'double braided twine' (*cordelette tressée double*) (Chavane 1985; Gallay *et al.* 1998; MacDonald 1996; Mbow 1997; Raimbault and Sanogo 1991).

Subsequently, variants became better characterised. Bedaux *et al.* (1978) identified three four-cord motifs (1a, 1b, 1c) that varied in size and tightness of weave, and one doubled four-cord motif (1i) at Toguere Galia and Toguere Doupwil in the Inland Niger Delta, Mali. The publication of *Prehistoric Cordage* by Hurley in 1979 provided a resource for specifying cord motifs and tools in more detail; unfortunately, as was revealed above, braided cords were poorly represented, and somewhat inaccurately described. At Jenné-jeno in 1980, S. McIntosh (1995) recognised four types of braided cords: Twines 1, 2, 3, and 10, now known to correspond to: (Twine 1) a simple or composite four- or eight- cord braided roulette (Figures 3.27, 3.28, 3.29), (Twine 2) a composite twelve-cord braided roulette (Figure 3.30), (Twine 3) a doubled four-cord braided roulette (Figure 3.31), and (Twine 10) a small, simple four-cord braided roulette (Figure 3.32). Following this usage, braided twine roulette was recognised in the Senegal Valley (S. McIntosh 2002; Bocoum and S. McIntosh 2002; Thiaw 1999) (Figure 3.33), in the Méma of Mali (Togola 2008) (see Figure 3.34 – an example of the very open-weave braided patterns that are common at Iron Age sites in that region), on the Niger Bend (Twines 1 and 3 – S. McIntosh and R. McIntosh 1985), and at Dia, Mali (Twines 1, 2, 3, and 10 – Haskell *et al.* 1988 – although they were at that time incorrectly attributed to two-cord braids). Subsequent research at Dia recognised two braided roulettes, 'CR-2' (a 3–4 cord braid) and 'CR-3' (doubled four-cord braid) (Schmidt *et al.* 2005).

Four-cord braided roulettes are best recorded archaeologically throughout the Middle Niger region and all along the Senegal Valley. They appear in the Méma from the second millennium BC, and in the Inland Niger Delta and the Senegal Valley in the first millennium BC. In the Méma, an early braided cord unlike those identified above is present from the second millennium BC (Figure 3.35). Doubled four-cord roulettes surge in popularity along the Middle Niger region in the first half of the first millennium AD. Twelve-cord roulettes become popular in the Inland Niger Delta after the late first millennium AD, but their larger distribution beyond the Inland Niger Delta is not known. Braided cord roulettes appear as a minority motif in the Chad Basin after 500 AD (Wiesmüller 2001).

Selected archaeological instances

The greatest diversity of braided cord roulettes is currently known from the Middle Niger region of Mali, where they have been recorded by:

Szumowski (1954, 1956a), '*barakalé*'; Inland Niger Delta (Inland Niger Delta) near Mopti

Bedaux *et al.* (1978, 132–138), 'motifs 1a, 1b, 1c, 1i'; Toguere Doupwil and Toguere Galia, Inland Niger Delta.

S. McIntosh and R. McIntosh (1980, 122, plate VI); 'Twines 1, 2, 3'; Jenné-jeno, Inland Niger Delta.

Curdy (1982), CORG and TRE four-cord braids; Tiébala, southwest Inland Niger Delta.

S. McIntosh (1995, 135–137, plates 7, 8), 'Twines 1, 2, 3, 10'; Jenné-jeno, Hambarkatolo, Kaniana, Inland Niger Delta.

Schmidt *et al.* (2005, fig. 7.1.7e, f), 'CR-2', 'CR-3'; Dia, Inland Niger Delta.

Szumowski (1956b), '*Lignes ondulées*'; Bandiagara.

Bedaux and Lange (1983, 'motifs 1a, 1f'), four-cord and doubled four-cord braid; Bandiagara.

Mayor *et al.* (2005, 36, fig. 4), '*cordelette tressée simple*', '*cordelette tressée double*'; Bandiagara Plateau.

Raimbault and Sanogo (1991, 345, 401–402), 'Twines 1, 3'; Lakes Region.

Szumowski (1957), '*barakalé*'; Macina.

S. McIntosh and R. McIntosh (1985, fig. 16), 'Twines 1, 3'; near Timbuktu.

MacDonald (1996), 'Braided twine'; western Gourma.

Togola (2008), 'Twine 1'; Akumbu, Méma.

Mayor (*in press*, fig. 9, third from top); 'braided cord roulette impression', Central Mali.

Braided cords are also known, with fewer variants so far, from the Senegal Valley:

Deme and S. McIntosh (2006), 'Twine 1'; Walaldé, Middle Senegal Valley.

Mbow (1997), '*Cordelette tressée*'; Senegal River Delta shell middens. However, the examples illustrated appear in fact to be counter-wrapped cord-wrapped stick (see MacDonald and Manning, this volume) so the presence of braided cord is uncertain.

S. McIntosh (2002, 67–68), 'Braided twine'; Cubalel, Sincu Bara, Middle Senegal Valley.

Thiaw (1999), 'Twine 1'; Arondo, Upper Senegal/Falemme Valley.

Braided cords are present, but comprise only a small percentage of decorative motifs in the Chad Basin after 500 AD;

Wiesmüller 2001 (figs 42a.2.3.a, b; 42b.2.3.a, b), '*geflochtenes Schnurroulette*', types 1 and 2.

And also from the Koro Toro region of Chad in the 'Early Iron Age'

Treinen-Claustre (1982, 50 and plate 3, nos 1, 4) '*Impressionnée à décor de chevrons*'.
Treinen-Claustre (1982, 103 and plates 25–29) '*Impressions d'une vannerie de type diagonal tissé croisé*'.

Sources of confusion

Fibrous materials other than cord, e.g. strips, may have been braided to create a very similar pattern, but this will lack evidence of beading reflecting the twisting of multiple fibres into a cord, and the borders of the impressions will be sharp, rather than rounded (see Mayor, this volume).

There is continuing discussion as to whether woven nets or textiles could have produced some of the motifs identified as braided cord, for instance through the use of textile-wrapped paddles (Introduction, this volume). This type of practice can only be detected if large sherds or whole vessels are recovered, showing the margins of the zones created by different impression events (Section 2, this volume).

Small, tightly-braided motifs (S. McIntosh 1995's 'Twine 10') can be difficult to recognise, but by taking the time to look at the direction of individual segments, the characteristic intersection at a perpendicular of one segment with its neighbour can be seen.

Counter-wrapped cord roulettes may be mistaken for composite four-cord braided roulettes, but close inspection will show that with the former, one cord consistently overlies the other, rather than showing the alternating under-then-over woven pattern of the latter.

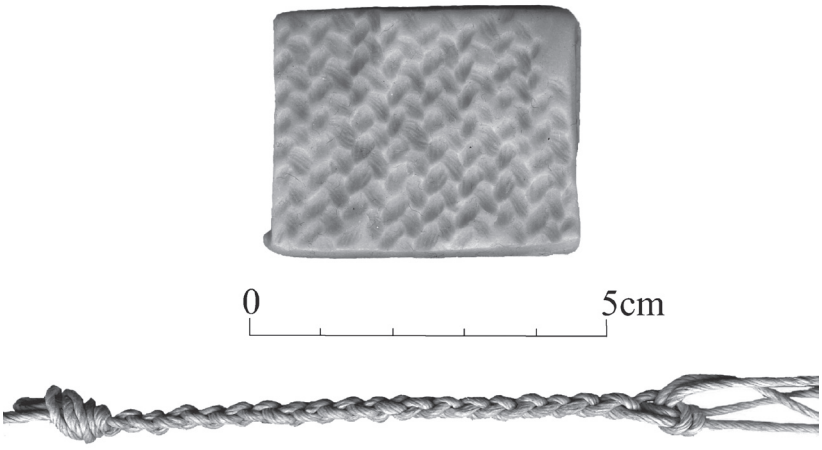

Figure 3.21 A four-cord simple braided roulette (experimental reconstruction). Photo: Susan McIntosh.

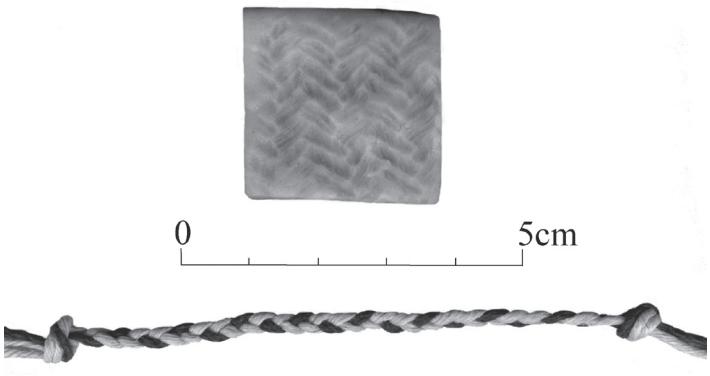

Figure 3.22. A three-cord simple braided roulette (experimental reconstruction). Photo: Susan McIntosh.

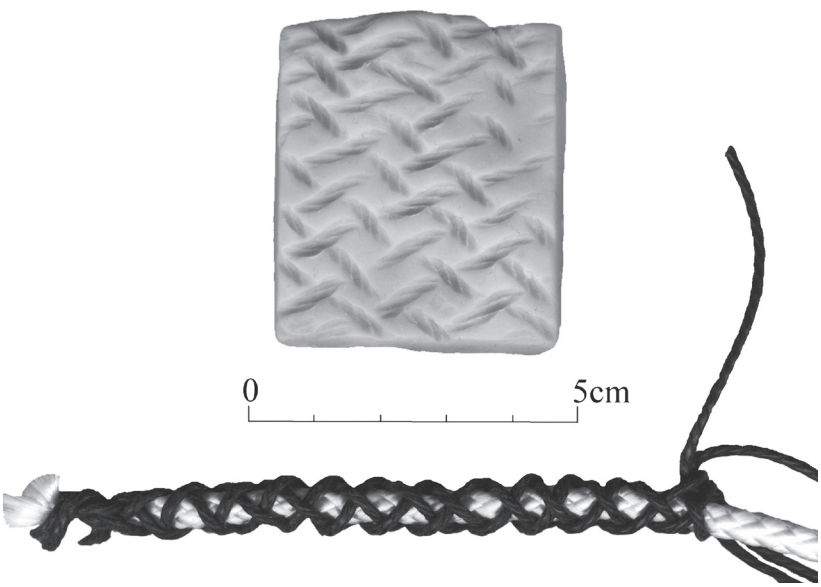

Figure 3.23. A four-cord composite braided roulette (experimental reconstruction). Photo: Susan McIntosh.

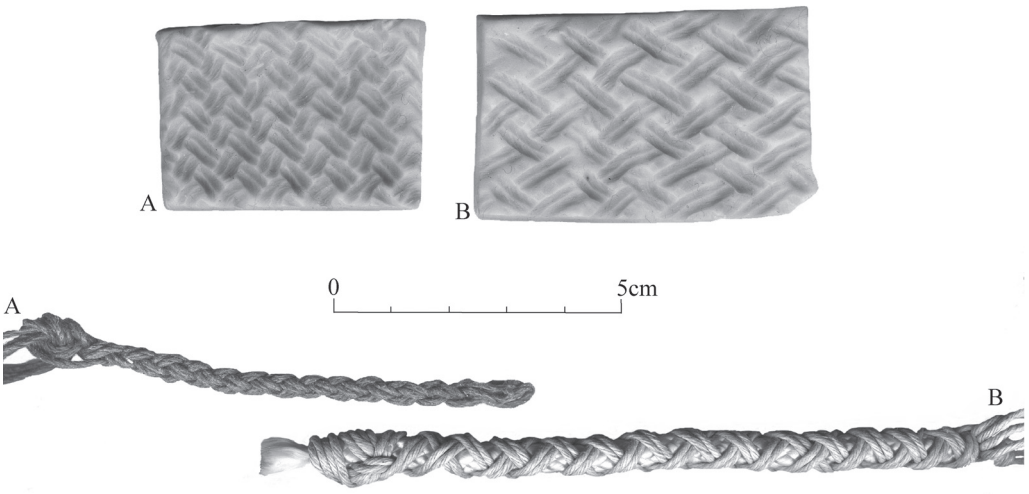

Figure 3.24. A: A double four-cord simple braided roulette, B: a composite four-cord braided roulette (experimental reconstruction) Photo: Susan McIntosh.

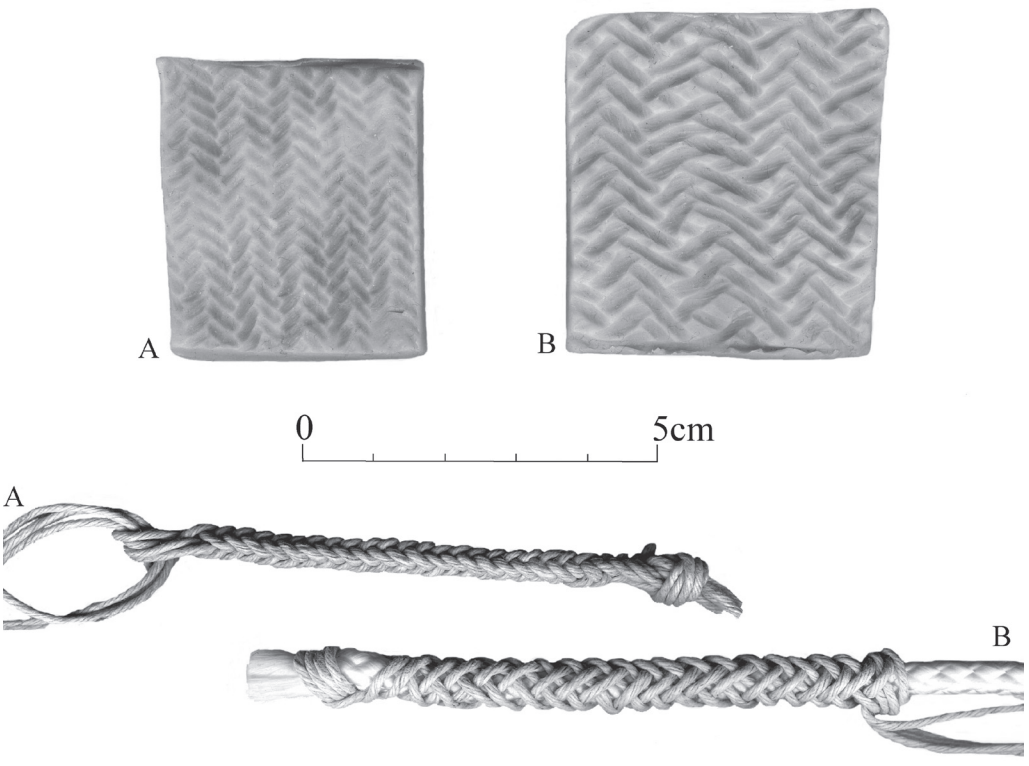

Figure 3.25. A: An eight-cord simple braided roulette, B: a composite eight-cord braided roulette (experimental reconstruction) Photo: Susan McIntosh.

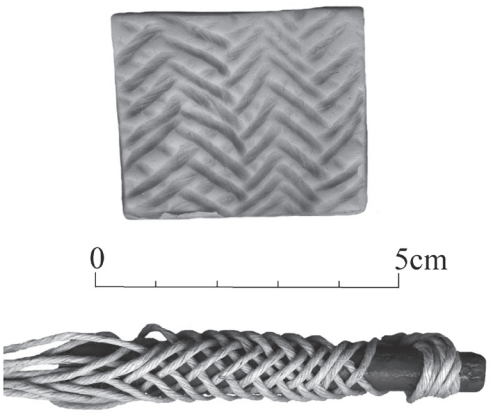

Figure 3.26. A twelve-cord composite braided roulette (experimental reconstruction). Photo: Susan McIntosh.

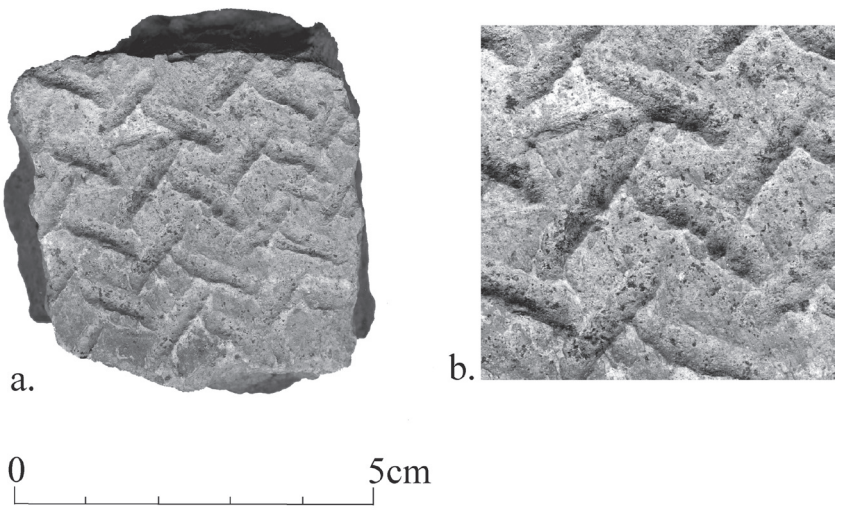

Figure 3.27. Sherd recovered from excavations at Jenné-jeno, Mali, unit LX-N, AD 1200–1400. The body bears impressions of a composite four-cord braided roulette motif. Photo: Susan McIntosh.

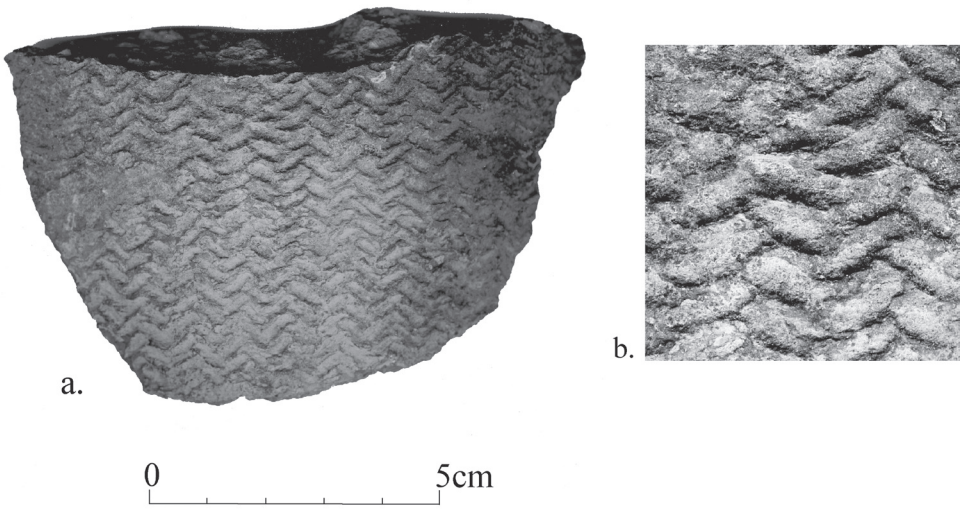

Figure 3.28. Sherd recovered from excavations at Jenné-jeno, Mali, unit LX-S, AD 1200–1400. The body bears impressions of a simple eight-cord braided roulette motif. Photo: Susan McIntosh.

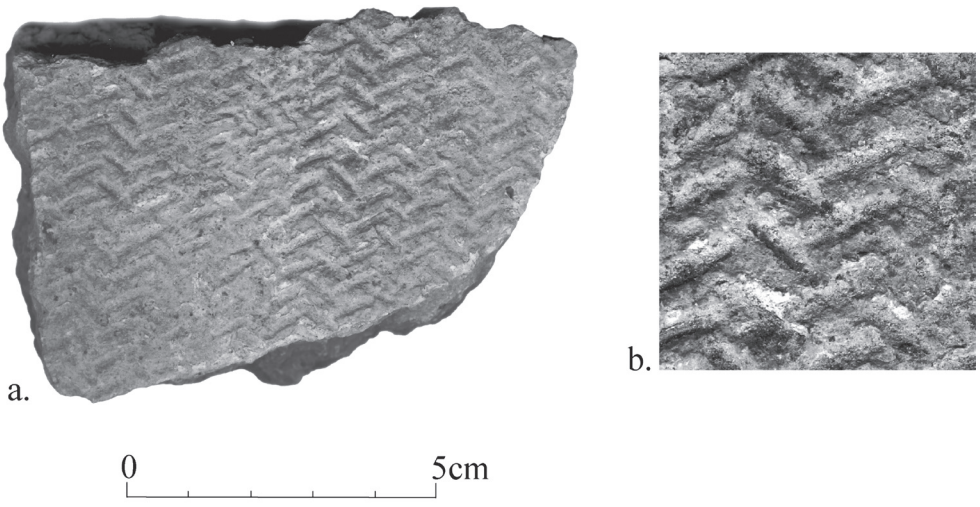

Figure 3.29. Sherd recovered from excavations at Jenné-jeno, Mali, unit LX-S, AD 1200–1400. The body bears impressions of a composite eight-cord braided roulette motif. Photo: Susan McIntosh.

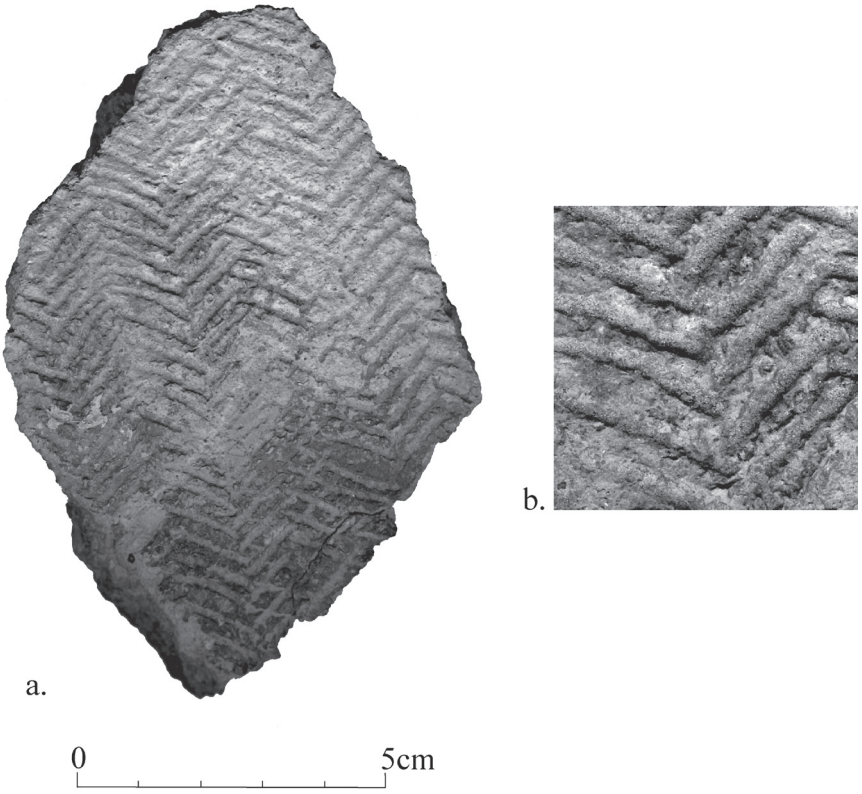

Figure 3.30. Sherd recovered from the surface at Jenné-jeno, Mali. The body bears impressions of a composite twelve-cord braided roulette motif. Photo: Susan McIntosh.

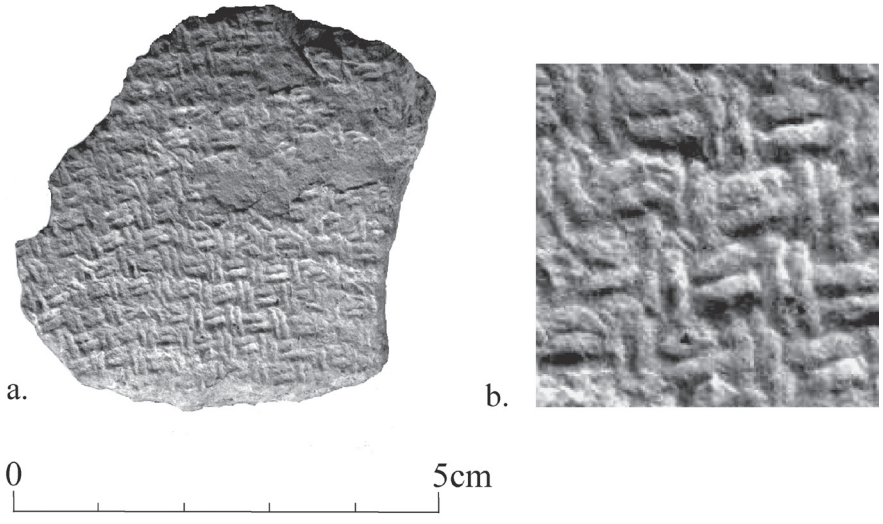

Figure 3.31. Sherd recovered from excavations at Jenné-jeno, Mali, LX-N, transition Phase IV/III, ca. AD 900. The body bears impressions of a doubled-four-cord braided roulette motif. Photo: Susan McIntosh.

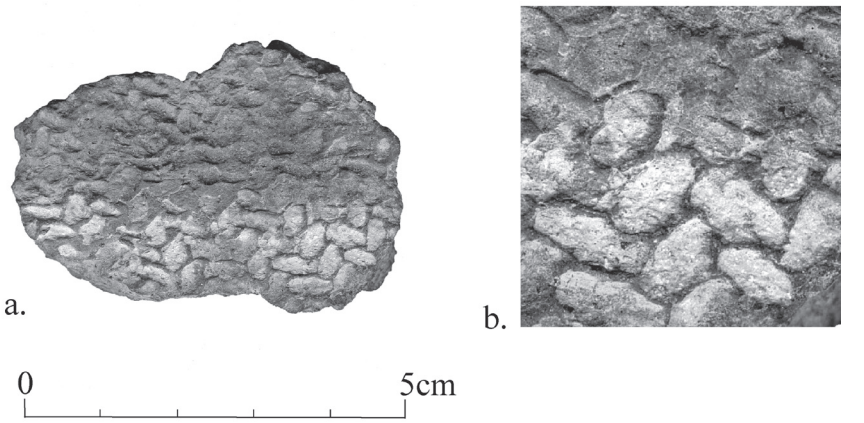

Figure 3.32. Sherd recovered from excavations at Jenné-jeno, Mali, Phase IV, AD 1200–1400. The body bears impressions of a simple four-cord braided roulette motif ('Rice grain' Tw 10). Photo: Susan McIntosh.

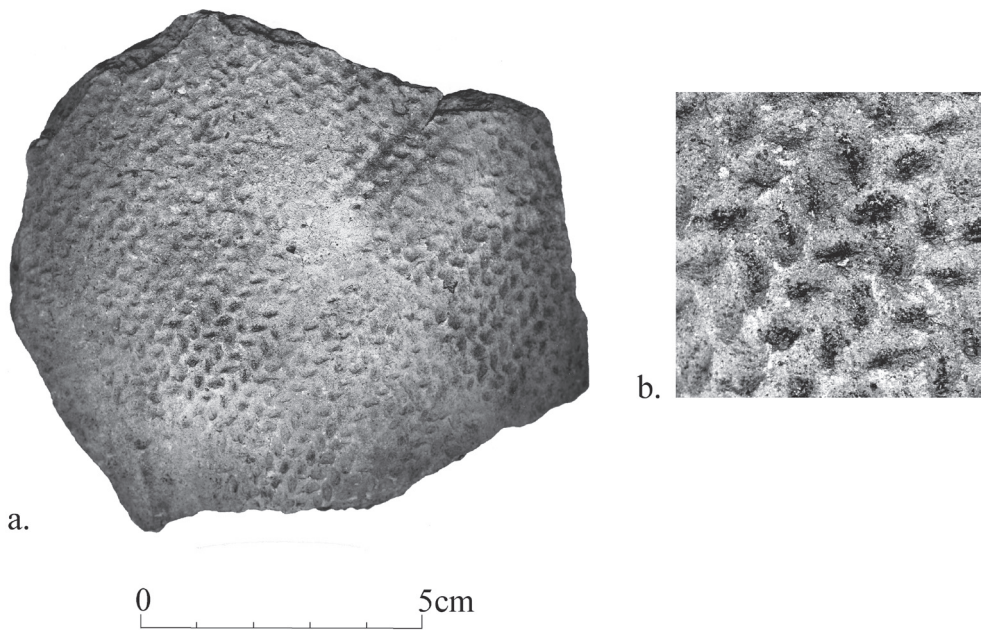

Figure 3.33. Sherd recovered from excavations at Cubalel, Mali, Unit C3A, AD 200–500. The body bears impressions of a simple four-cord braided roulette motif. Photo: Susan McIntosh.

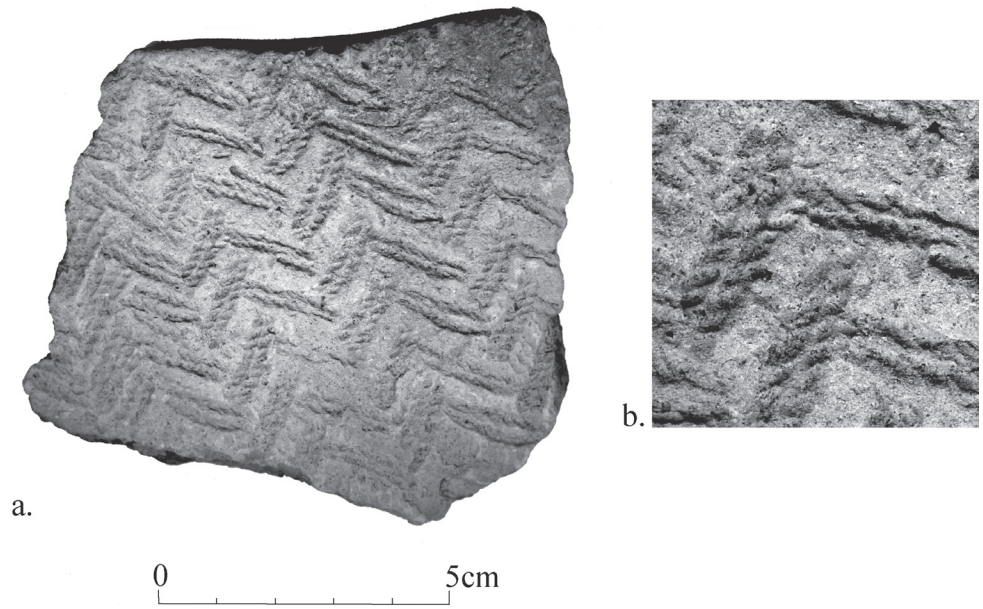

Figure 3.34. Sherd recovered from excavations at Akumbu, Méma, Mali, first millennium AD. The body bears impressions of a doubled eight-cord composite braided roulette motif. Photo: Susan McIntosh.

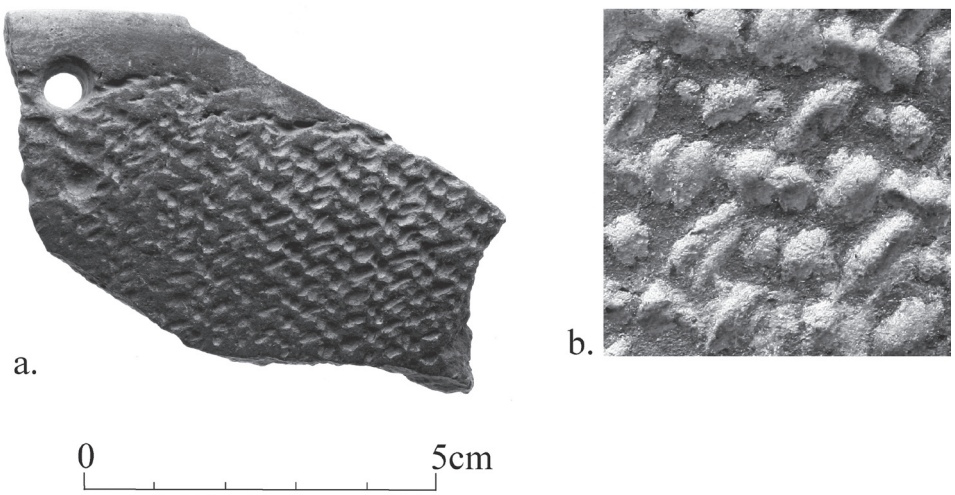

Figure 3.35. Sherd recovered from Beretouma, Méma, Mali, 2000–800 BC. This motif is unlike any of the other braided cord motifs discussed here; it is thought to have been created with a roulette similar to the ethnographic example pictured in Figure 1.4, which is not like any of the experimental braided examples. Photo: Kevin MacDonald.

Folded strip roulette
Roulette de fibre plate pliée

Anne Haour and Daouda Keita

Appearance of the archaeological material

Sherds bearing impressions of rolled folded strip roulettes generally display parallel, usually diagonal, rows of convex, angular impressions. These impressions typically resemble grains of rice by their shape, but more irregular square or rectangular impressions can also occur. On plasticine casts, rows are linked by faint perpendicular lines, giving the appearance of a ladder; these lines can also sometimes be seen on well-preserved sherds.

Description of the tool

These impressions result from a roulette made of folded strips, which is typically rolled over the wet clay. In contrast to cord roulettes, which create predominantly concave impressions, strip roulettes tend to create rather angular, and convex, impressions: this is because the use of relatively rigid flat fibres in the manufacture of the roulette results in voids within the tool structure, into which the clay is forced when the tool is rolled (see Soper 1985, 35–38 and contrast his figs 4.1 and 5.1). This is true of folded strip roulettes, the impressions of which are characterised by parallel rows of convex shapes, sometimes linked by faint lines resulting from the impression of the side of the roulette. The relative rigidity of the roulette typically confers a distinctive regularity and evenness to the decoration (see e.g. Figures 3.38, 3.39 and 3.42). The variability generated by various degrees of tightness in the fold can be seen on Figure 3.39, where two different folded strip roulettes were apparently used on the rim and upper body. The decoration can be less easy to identify if more flexible materials or a loose folding (see Figures 3.41 and 3.43) were employed, or if the roulette was poorly impressed or various planes overlap (see Figure 3.37). In these circumstances, less ordered patterns are created, and the tool responsible is thus less easy to identify (see also Sections 1 and 2, this volume).

As regards the manipulation aspect in the manufacture of folded strip roulettes, the literature contains a vast range of terminologies, unsystematic and sometimes inaccurate. 'Twisted', 'plaited', 'pleated', and 'knotted' are some of the terms that have been used to refer to the one and same tool. Part of the difficulty lies in the fact that strip roulettes represent a vast category, seemingly with a vast range of possible variants. Soper (1985, 39) commented that a great variety of strip roulettes exists

in archaeological material in West Africa, still requiring identification and detailed analysis. These analyses still remain largely to be done [although see Langlois (2004) for a recent overview; and in this volume, Section 1, and Section 3 entries for braided strip and knotted strip roulettes]. This said, of the vast strip roulette family, folded strip roulettes remain some of the best documented archaeologically, and characterisation is always improving. In archaeological material from the Nigerian Chad Basin, for instance, these impressions, first called 'nodular roulettes' (Connah 1981; Connah and Daniels 2003), are now referred to by the more descriptive term 'twisted strip roulette' (see e.g. Gronenborn and Magnavita 2000; Wiesmüller 2001). This latter terminology is inspired, presumably, by the twisting motion that can be involved in the manufacture of folded roulettes, and by the twisted appearance this imparts to the finished tool (see this volume, Section 1 and Section 2, especially Figure 2.4).

Soper's 1985 paper, which proved a benchmark for subsequent studies, unfortunately did not provide an illustration of a folded strip roulette. His 'accordion pleat' strip roulette (Soper 1985, fig. 6), which is in fact knotted, should not be confused with the accordion pleat strip roulette defined by S. McIntosh (1995, plate 9), which is folded (on this, see also knotted strip roulette entry, this volume). Although folded strip roulettes do not feature in Soper's key work, examples drawn from ethnographic and museum collections have been published in the context of the interpretation of archaeological finds by, among others, Bedaux and Lange (1983, fig. 2[1]), S. McIntosh (1995, plate 9), and Haour and Galpine (2005, fig. 3, showing an item from the Pitt Rivers Museum [1979.20.28]).

Terminology and distribution

Folded strip roulette impressions are attested early at Dia (Mali), in deposits dated around 800–400 BC, and they are common throughout the remainder of the sequence there (Schmidt *et al.* 2005). They are also present in the late first millennium BC at Jenné-jeno (from 200 BC; S. McIntosh 1995) and in the earliest deposits at Akumbu, Mali (MacDonald and Schmidt 2004; Togola 2008; see Figure 3.36). Folded strip roulette impressions are however absent in excavated second- and first-millennium BC sequences of Dhar Néma, in south-eastern Mauritania, where they first appear much later, between about AD 1200 and 1400 at the site of Bou Khzama III (MacDonald *et al.* 2009, 31). Indeed, folded strip roulettes seem widespread in second-millennium AD sites, from the Middle Niger to the Chad Basin, the urban complex of Koumbi Saleh (Berthier 1997, plate XXII.4) and the site of Yau in the Chad Basin (Connah 1981) illustrating two relatively early such poles at opposite ends of West Africa.

The occurrence of folded strip roulette impressions has been built into a number of cultural models by archaeologists. Notably, in the Chad Basin, such decorations appear to be linked, together with the incised slipped decoration known as 'sgraffito', with the southward expansion of the Kanem-Borno polity between the ninth and fifteenth centuries AD (Connah 1981; Gronenborn and Magnavita 2000; Wiesmüller 2001). Additionally, in Mali, Mayor *et al.* (2005, 47–48) propose that folded strip roulettes may be linked to early Soninke populations associated with the Empire of Ghana.

Selected archaeological instances

Akumbu, and elsewhere in the Méma region, Mali, first millennium BC–first millennium AD
'Plaited twine' or 'Twine 4' (Togola 2008); 'pleated cord roulette' (MacDonald and Schmidt 2004).

Dia, Mali, from Horizon Ia, 800–400 BC onwards
'Roulette à brins tressés', ('CR-4') (Schmidt *et al*. 2005, fig. 7.1.7.g).

Jenné-jeno, Mali, from Phase I, 200 BC–AD 400 onwards
'Twines 4 and 5', 'Accordion-pleat strip roulette' (S. McIntosh 1995, plates 6, 9, 10).

Sincu Bara, Senegal, AD 400–900
'Plaited twine' (S. McIntosh and Bocoum 2000, fig. 11, bottom left).

Bandiagara, Mali, from the third century BC approximately
'Tresse à cordes/brins' (Bedaux and Lange 1983, fig. 1.1b).

Kumbi Saleh, Mauritania, from the late ninth century AD
'Impressions au peigne fileté rigide' (Berthier 1997, plate XXII.4).

Daima, Dikwa, Yau, Mege and multiple other sites of the Chad Basin, Nigeria, after about AD 900–1400 [Gronenborn and Magnavita 2000, fig. 1 shows very clearly the southward trend in the distribution of this decoration type].
'Nodular roulette' (Connah 1981, fig. 4.9.16; Connah and Daniels 2003, figs 4.51, 4.53, and 4.54), 'Twisted strip roulette' (Gronenborn and Magnavita 2000, figs 8.2, 8.3), 'Simple twisted strip roulette/einfach gezwirntes Bandroulette' (Wiesmüller 2001, figs 42b.3.1a, b).

Bou Khzama III, Dhar Néma, Mauritania, approximately AD 1200–1400
'Accordion pleat roulette' (MacDonald *et al.* 2009, 31).

Kufan Kanawa, Niger, approximately AD 1400–1650
'R, rice grain roulette' (Haour 2003, figs 7.4., 7.5, 7.8 especially).

Garumele, Niger, approximately AD 1400–1850
'Pleated strip roulette' (Haour 2008, fig. 5c).

Dogon Country, first millennium AD
'Folded strip roulette impression' (Mayor, *in press*, fig. 9, second from top).

Kubanni Valley, Zaria, Nigeria, mid-eleventh century AD terminus post quem
Identified either as maize impressions (contradicting likely age) or (by R. Soper) as some kind of flexible roulette (Potocki 1974, fig. 2).

Sources of confusion

Despite the fact that variations in the tightness of the folding can cause considerable differences in size and orientation of the impressions, folded strip roulettes are relatively easy to recognise, because the individual impressions are typically convex and are ordered in distinct, regular rows. These characteristics generally allow folded strip roulettes to be distinguished from other roulettes. As emerged in the discussion above, however, there exists a considerable scope for confusion with knotted strip roulettes, due to the fact that folded and knotted strip roulettes have often been wrongly equated in the West African archaeological literature (see also this volume, knotted strip roulette entry). This relates to an issue of inconsistent description, which can be expected to improve as an ever-growing body of archaeological data becomes available, and as methodologies advance (Section 2, this volume).

Confusions between impressions of folded strip roulettes and those of other tools which also involve an acting part characterised by voids, such as carved roulettes or husked cobs, can usually be avoided thanks to differences in the shape of the respective impressions, but eroded specimens can be problematic. Likewise, some mat impressions may be confused with folded strip roulette impressions (see for example the '*Hexagonale Matte*' illustrated by Wiesmüller 2001, [Fig. 41b.4a], showing stacked convex nodules). Mat impressions are generally less angular, which can help differentiate them, but beyond this the most reliable clue lies in the identification of regular repetitions in the pattern, suggestive of the use of a roulette (Section 2, this volume).

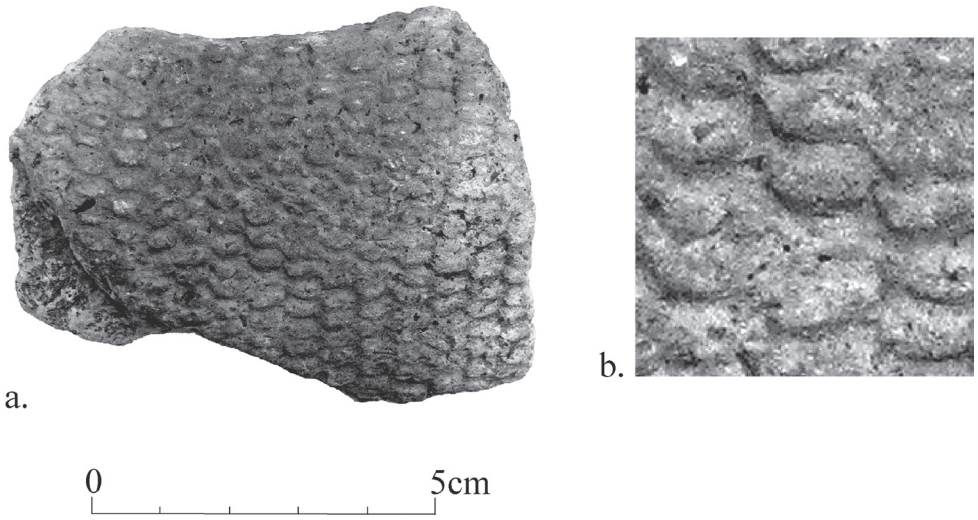

Figure 3.36. Sherd recovered from excavations at Akumbu, Mali, Unit AK3. There is no direct date on the context from which it came, but it occurs more than one metre below a date of AD 330–540. The body bears impressions of a rolled folded strip roulette. The Akumbu excavations were published posthumously in Togola (2008); the later work from which the above sherd issued remains unpublished, though see MacDonald and Schmidt (2004). Photo: Kevin MacDonald.

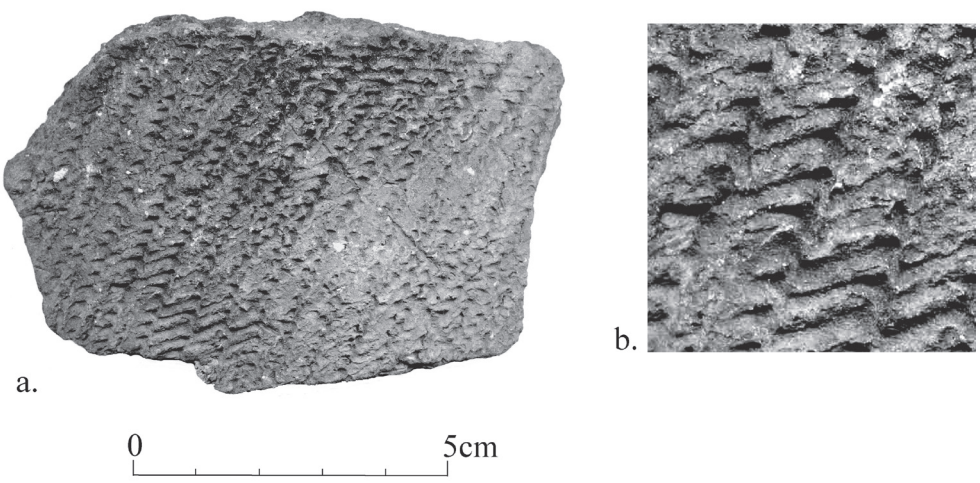

Figure 3.37. Sherd recovered from excavations at Garumele, Niger, basal deposits, late second millennium AD. The body bears impressions of a rolled folded strip roulette. The 'sideways Z' shape of the impressions, described in Section 1 as characteristic of folded strip roulettes, is clearly visible here. Photo: Anne Haour.

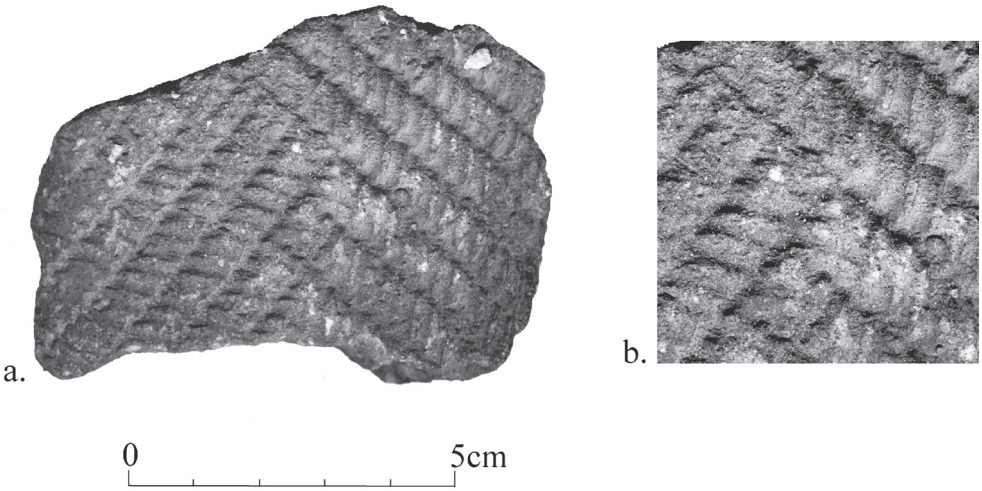

Figure 3.38. Sherd recovered from excavations at Cubalel, Middle Senegal Valley, Senegal, late first millennium AD. The body bears impressions of a rolled folded strip roulette. Two convergent planes of rouletting can be seen meeting here with unusual clarity. Photo: Susan McIntosh.

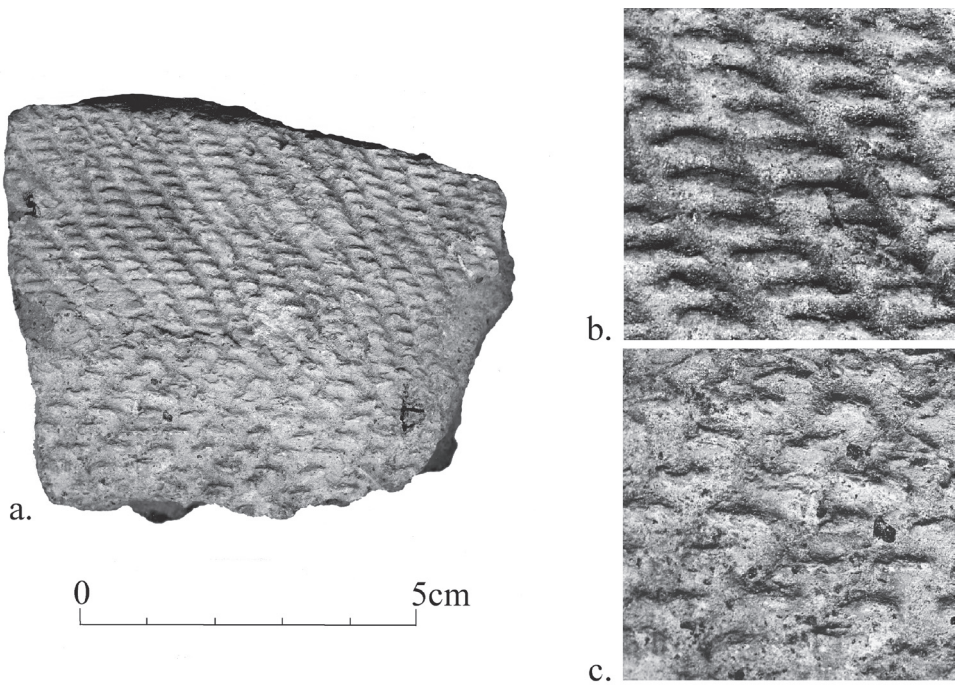

Figure 3.39. Sherd recovered from excavations at Hambarketolo, Mali, first millennium AD. The body bears impressions of a rolled folded strip roulette. Two different types of folded strip rouletting can be seen here, and the size and crispness of convex impressions varies greatly. The rouletting on the rim results presumably from the use of a very tightly folded roulette; that used on the shoulder was apparently less tightly folded. Photo: Susan McIntosh.

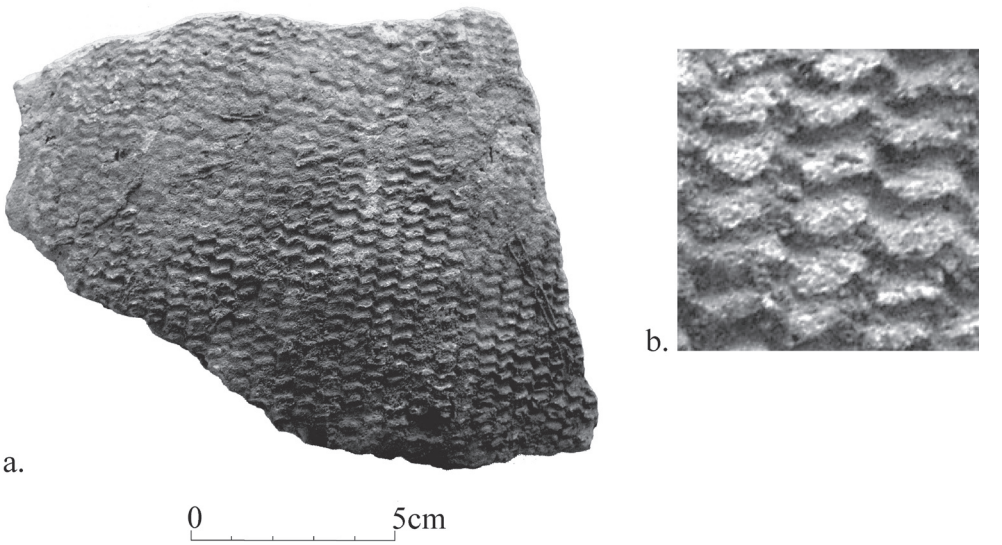

Figure 3.40. Sherd issued from excavations at Songona 2, Dogon Country, Mali, fifth to eleventh centuries AD. The body bears impressions of a folded strip roulette, a decoration which characterised over ninety percent of this assemblage. Photo: Anne Mayor.

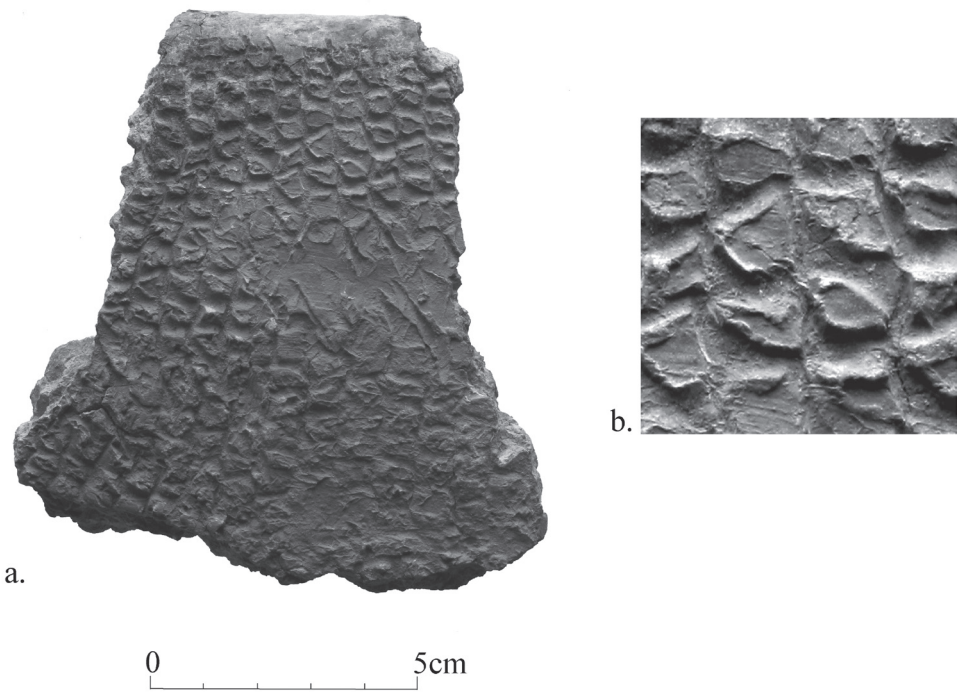

Figure 3.41. Sherd recovered from excavations at Tongo Maré Diabel, Mali, AD 700–950. The neck and upper body bear impressions of a loosely folded rolled strip roulette. Photo: Kevin MacDonald.

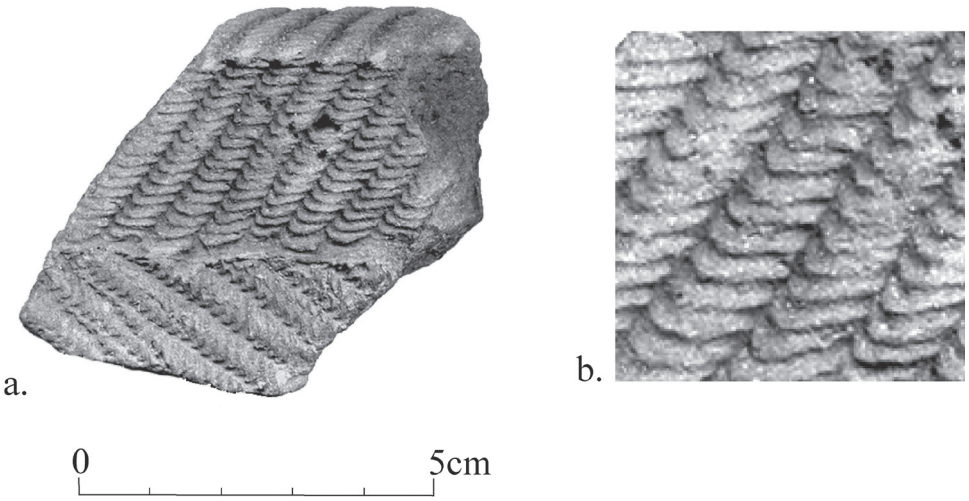

Figure 3.42. Sherd recovered from excavations at Tiep, Senegal, 1600–1900 AD. The neck and upper body bear impressions of a rolled folded strip roulette. Photo: Ndèye Sokhna Guèye.

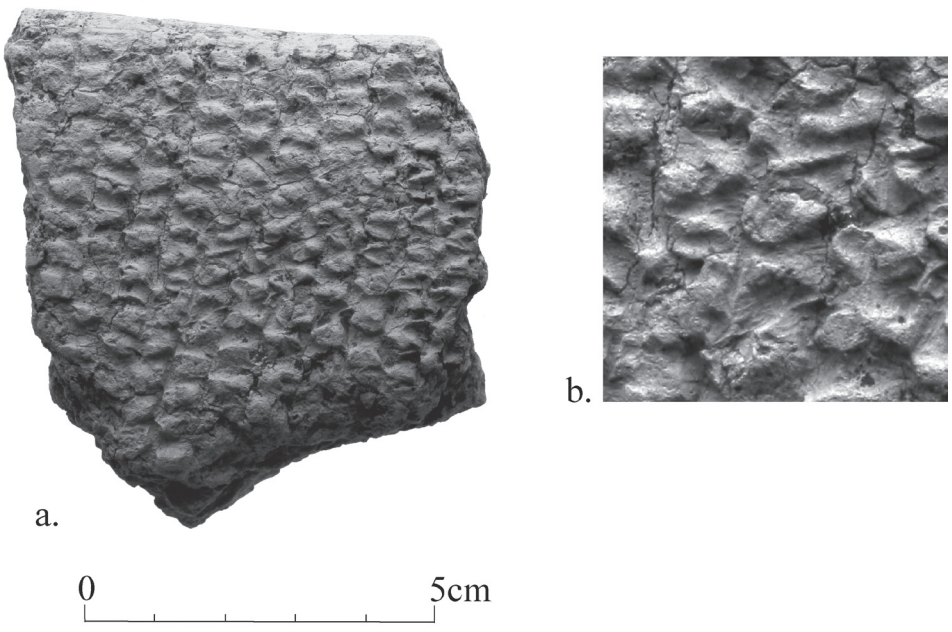

Figure 3.43. Sherd recovered from the abandonment horizon at Sorotomo, Mali, ca. AD 1500. The neck and upper body bear impressions of a rolled folded strip roulette. The roulette used here was loosely folded, and the convex impressions are thus relatively disordered. Photo: Kevin MacDonald.

Knotted strip roulette
Roulette de fibre plate nouée

Anne Haour

Appearance of the archaeological material

Sherds bearing impressions of knotted strip roulettes display parallel, often diagonal, rows of convex impressions. Typically, these impressions occur in the form of oval or diamond-like shapes arranged in pairs, creating rows of dumbbell-like shapes. These rows run diagonally, and may also be arranged to create a herringbone pattern.

Description of the tool

These impressions result from a roulette made of knotted strips, which is typically rolled over the clay. The different subtypes within this category are only just beginning to be documented ethnographically (Section 1, this volume); however, in an archaeological perspective, the best-known knotted strip roulette was that defined and illustrated by Soper (1985). Described as the 'most common form' of knotted strip roulette, this was a modern Kenyan item made of plastic baling tape, "made from a single strip looped back through itself to give a roulette with a pentagonal cross-section" (Soper 1985, 35–37). It was shown (Soper 1985, fig. 5.1) alongside a recent Iron Age sherd (Soper 1985, fig. 5.2) which was thought to have been decorated with a similar roulette. Such impressions indeed seem amply documented in the East African archaeological record (e.g. Figure 3.44), which was Soper's source data; the implement shown by Soper can, in effect, be considered the only 'true' knotted strip roulette (KPR). This term 'knotted strip roulette' introduced a useful sense of order by replacing the previous usage (including by Soper himself; e.g. Soper 1971, 1979; Soper and Golden 1969) of the terms 'plaited cord', 'knotted cord', and 'plaited fibre'. The tool can also be knotted alternately to produce rows forming a herringbone pattern (Figure 3.45; see also Trowell 1960, plate LXX, bottom right, top middle implement and impression).

In his 1985 paper, Soper also illustrated another type of knotted strip roulette, which he called an 'accordion pleat'. This, which he described as an "almost square-sectioned roulette made from four interwoven strips" (Soper 1985, 39), was illustrated alongside a (hypothetically) corresponding single undated sherd from western Kenya, which featured vertical rows of staggered convex impressions (Soper 1985, fig. 6). Though this sort of implement can easily be replicated by knotting two (or indeed, probably more) pairs of flat fibres, it is not clear whether it had been documented ethnographically by Soper – or, indeed, archaeologically, despite the proposed reconstruction.

Thus, in the paper which became a benchmark for decades of roulette research, just two illustrations of knotted strip roulettes were provided, even though the range of possible manipulation techniques was hinted at. These two illustrations have been oft-cited, and have caused considerable confusion. In particular, the term 'accordion pleat' has frequently been used to refer to implements which were in fact manufactured not by knotting, but rather by folding;[1] this has been a particular problem for West Africanists. While true knotted strip roulettes appear to be very common in East Africa, West Africa seems – as indeed was already noted by Soper (1985, 39) – to include a very much wider range of types of strip roulette.

It is therefore slowly becoming clear that Soper's classification and images transfer uneasily to the West African context (on this see also Langlois 2004, 110). In fact, it remains debateable whether 'true' knotted strip roulettes as understood by Soper (1985) have ever been convincingly recognised in West Africa, either archaeologically or ethnographically. Indeed, in recent times their distribution seems not to have extended west of south-eastern Nigeria (see Section 1, and examples pictured in Trowell 1960, plate LXX, bottom right, topmost four specimens; Langlois 2004, fig. 2; http://cerafim.free.fr/francais/objets/instruments/roulettes/fibresplates.htm; Livingstone Smith 2007, fig. 1C). It is certain that a wide range of past and present knotted strip roulettes may yet be recognised, perhaps primarily through the study of museum holdings, with significant applicability to archaeological studies.

Terminology and distribution

In East Africa, knotted strip roulettes are typical of relatively recent, 'Iron Age', contexts, with most finds coming from second millennium AD contexts. In the Great Lakes area, the shift around AD 1000 from the earlier, primarily incised wares to roulette-decorated pottery (where knotted strip roulettes feature prominently) forms a central research question (Posnansky 1961 for an early statement; Stewart 1993 for a recent overview). Illustrations typically show the easily-recognised classic knotted strip roulette impressions, with their parallel, slightly spaced diagonal rows of paired impressions. In central Africa, a first millennium BC date is indicated by works in the Central African Republic (Zangato, cited in Langlois 2004, 119; the decorations there called '*motifs en cordelette roulée*' are conclusively identified by Langlois as knotted strip roulette impressions).

In West Africa, the occurrence of 'true' knotted strip roulettes remains in doubt, as noted above. Reported instances are unclear, and seem to relate to small assemblages; and if indeed they do represent knotted strip roulettes, they seem to belong to a type distinct from Soper's classic 'KPR'. At Dia, knotted strip motifs ('CR-5', '*Roulette à brins noués*', Schmidt *et al*. 2005, fig. 7.1.7.h) were quite rare, accounting at most for just over half a percent of the assemblage (in Dia-Shoma's Horizons II–IV, approximately 0–AD 1600) (Schmidt *et al*. 2005, 221, 234, tables 7.1.10a, b). In the Kano region, Nigeria, surface surveys revealed knotted strip rouletting to be common, and a very early date of the third millennium BC has been suggested for one such sherd (Darling 1988), but the context of the find is not clear and the illustration of the decoration (Darling 1988, fig. 2) rather hazy. In both the Dia and Kano cases, the sherds feature impressions in

the shape of squares, not arranged in pairs, so they differ considerably from known East African examples of 'KPR'.

Selected archaeological instances

Mwanza, Tanzania, undated but seeming to be relatively recent, falling within the scope of current tradition
'Plaited roulette' (Soper and Golden 1969, plate X 6–8).

Chobi sector, Murchison Falls National Park, Uganda, likely falling within the past 500 years
'Plaited cord roulette' (Soper 1971, figs 9a-c, f).

Mubende Hill, Uganda, likely post AD 1100
'Knotted-strip roulettes' (Robertshaw 1994, fig. 5, top).

Dahwe, Rwanda, second half of second millennium AD; however, Desmedt suggests that in Uganda this group appears earlier, in the first centuries of the second millennium AD.
'Roulette nouée' (Desmedt 1991, fig. 3).

Sources of confusion

Archaeologically, there has been considerable confusion in the identification of knotted strip roulette impressions. Although the East African 'true' knotted strip roulettes are quite distinctive, featuring parallel, slightly spaced diagonal rows of paired impressions, other types of knotted strip roulette are poorly documented archaeologically, little-illustrated, and may well be less characteristic. In particular, the image published by Soper (1985, fig. 6) of an experimental 'Accordion pleat' strip roulette with a sherd alongside it plainly illustrates the potential confusion with impressions of folded strip roulettes (see Haour and Keita, this volume). Furthermore, braided strip roulette impressions, which have only just been properly recognised (see Mayor, this volume) may be more common in West Africa than has previously been realised, and may thus lie behind many decorations mis-identified as knotted strip roulettes.

This confusion between different types of strip roulette is perhaps unsurprising, since even in the case of tools in museum collections, which can be examined at leisure, it can be difficult to discern the number of strips used and the manipulation that was applied to them – knotting, braiding or folding.

Note

1 This is the case, for example, of the 'accordion-style roulette' impressions defined by S. McIntosh (1995) as 'Twine 4' and 'Twine 5', and by Mayor *et al.* (2005) and MacDonald *et al.* (2009) (following McIntosh's usage) as 'Accordion-plaited' or 'Accordion pleat' roulettes. The roulettes involved there were folded, not knotted – as S. McIntosh (1995, 136) clearly states, describing "strips of grass frond or reed … pleated back-and-forth on top of one other, accordion style, creating a roulette that is square or pentagonal in crosssection" – but the similarity to Soper's terminology caused misunderstandings (see e.g. Langlois 2004, note 5). See Haour and Keita, this volume.

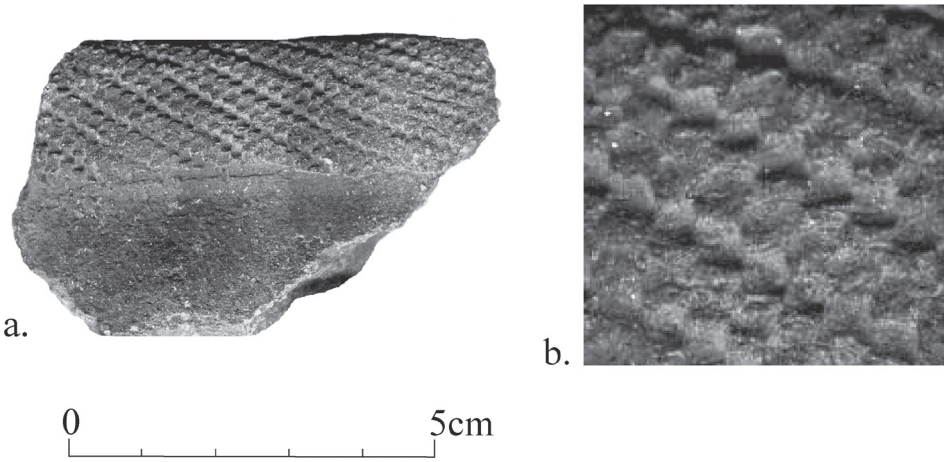

Figure 3.44. Sherd recovered from the surface at Ntusi II, Uganda, AD 1400–1600. It features two vertical stripes of red paint applied with a finger over knotted strip roulette decoration. Photo: Andrew Reid.

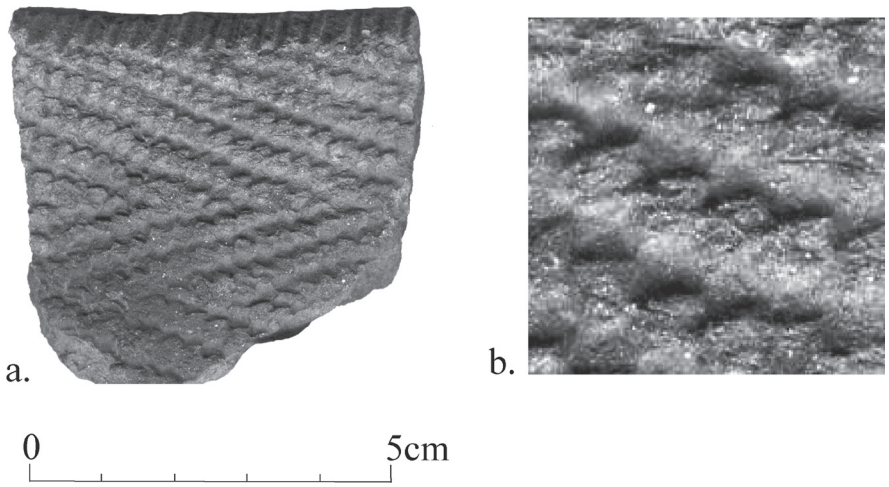

Figure 3.45. Sherd recovered from the surface at Ntusi I, Uganda, ca. AD 1400. The body bears impressions of a knotted strip roulette decoration. The herringbone pattern results from a change in the direction of the knotting midway down the roulette. The rim bears, in addition, small parallel notches, a feature occurring fairly commonly in this context. Photo: Andrew Reid.

Braided strip roulette
Roulette de fibre plate tressée

Anne Mayor

Appearance of the archaeological material

Sherds bearing impressions of braided strip roulette generally display parallel rows of concave impressions of which the edges form a sawtooth, in the manner of the steps of a staircase. The rows may change direction at a right angle, forming a herringbone pattern. Impressions are highly variable, ranging from very fine to very large, and with varying tightnesses.

Description of the tool

The tools causing this decoration are braided strip roulettes which, as documented ethnographically, are made of five or more lengths of a flexible flat fibre, which are folded in their middle and braided to form a helix-like structure (Section 1, this volume). These implements are then rolled over the wet clay. A change of direction during braiding, once or several times (Figure 1.24, Section 1), produces a chevron pattern in the rolled impression.

Terminology and distribution

Braided strip rouletting on archaeological material has been recognised under a variety of names. It was first described as *barakalé* in Mali (Szumowski 1956a). Based on experimental reconstruction aiming at identifying archaeological material from Kororofa, Nigeria, it was then called plaited cord-roulette by de Meulemeester (1975, 'Type 2'); this reconstruction was subsequently used as an analogy for the *roulette de cordelettes à brins tressés* in Mali (Bedaux *et al.* 1978, motifs 1e and probably 1g; Bedaux and Lange 1983, motifs 1c1, 1c2 and 1c3) and the *roulette tressée à quatre brins* in Rwanda (Desmedt 1991). This decoration was also described as a *roulette de fibre plate nouée en scoubidou cylindrique* in Cameroon, with reference to a Malian ethnographic tool of which the production technique was poorly understood (Langlois 2004), and finally as *tresses simples* or *tresses alternes* in Mali, with reference to ethnographic tools still used there today (Mayor *et al.* 2005). These often incorrect terminologies reflect the confusion that has reigned until recently concerning both the manner in which such tools were made

(Section 1, this volume), and the identification of their impressions on archaeological materials.

In the current state of knowledge, it seems that there exist two early zones of appearance of this decoration. The first, apparently isolated, instance is south of Lake Chad, in the province of Diamaré in northern Cameroon, around the first and second centuries AD (Langlois 2004). The second is Dogon Country in Mali. In the latter region, the decoration occurs in 'Toloy' assemblages, dated to the second half of the first millennium BC, but these assemblages may result in part from a mixture of several periods. The decoration is, however, found in large quantities in the Dogon country from the second to the mid-twentieth centuries AD (Bedaux and Lange 1983; Mayor 2005; Mayor *et al.* 2005; Guindo 2006; Huysecom *et al.* 2007; Mayor *in press*, Huysecom *et al. in press*) (see e.g. Figure 3.46). It is present in very low percentages (as an import) on the southern fringe of the Inland Niger Delta, but is a common roulette at sites dated between the seventeenth and nineteenth centuries AD, associated with the Bamana Empire of Ségou (MacDonald and Camara *in press*) (Figure 3.47). Between these two zones – Cameroon and Mali – such impressions have also been reported recently at protohistoric sites in Burkina Faso, Ghana (Figures 3.48 and 3.49) and Nigeria, but they remain poorly documented.

Given such confusion in their identification, it is quite likely that braided strip roulettes were also used at Kororofa, Nigeria (fifteenth to seventeenth centuries AD) and Gisagara ('group W'), Rwanda (beginning of second millennium AD), rather than the 'Type 2' experimental roulette proposed by De Meulemeester (1975). It may also have been present at Bunyoro-Kitara in Uganda, incorrectly subsumed under the term knotted strip roulette, but this cannot be confirmed as no illustration is provided in the publication (Robertshaw 1994).

Thus, in the current state of research, braided strip roulette decoration seems to have appeared at sites dated around 2000 years ago in different parts of West Africa, such as the Dogon Country of Mali and the Diamaré in northern Cameroon, then spread among several cultural groups along a curved band from Mali to Rwanda. A broader distribution is quite possible, but is difficult to determine given the current poor recognition of this decorative type.

Selected archaeological instances

Muzenga and Gisagara, Rwanda, beginning of second millennium AD
'Roulette tressée à quatre brins' (Desmedt 1991, figs 4, 5).

Bibalé-Tchuin, Diamaré, Northern Cameroon, first and second centuries AD
'Fibre plate nouée en scoubidou cylindrique' (Langlois 2004, 116, fig. 4i–p).

Kororofa, Northern Nigeria, fifteenth-seventeenth centuries AD
'Type 2' (De Meulemeester 1975, fig. 1, plate XXXIX, 5–8).

Turunku (former Zaria), Northern Nigeria, protohistoric
Clement Bakinde, Ahmadu Bello University Zaria, *pers. comm.*

Wenchi, Ghana, protohistoric
Abass Iddrisu, University of Ghana-Legon, *pers. comm.*

Birifoh (SiLayiri), northern Ghana, protohistoric
Malik Saako Mahmoud, University of Ghana-Legon, *pers. comm.*

Bandiagara, Mali: 'Toloy' (second half of the first millennium BC) and 'Tellem' (eleventh-fifteenth centuries AD) caves
'Roulette de cordelettes à brins tressés' (Bedaux and Lange 1983).

Ka In Ouro Koro, Yatenga, northern Burkina Faso, undated but thought to be second millennium AD
'Scoubidou' (Mayor 2005, fig. 101a).

Damassogou (second to thirteenth centuries AD) and Ambèrè-Dougon (fifth to thirteenth centuries AD), Seno Plain, Mali
'Scoubidou simple', 'scoubidou alterne' (Guindo 2006; Huysecom *et al.* 2007, fig. 32).

Dangandouloun (seventh to twelfth centuries AD), Promontoire d'Ounjougou (seventh to thirteenth centuries AD), and Orosogou (fifteenth-sixteenth centuries AD), Plateau of Bandiagara, Mali
'Scoubidou cylindrique simple', 'scoubidou cylindrique alterne' (Mayor 2005, figs 61, 113, 115, 119, 120, 136, 137, 138, 139, 141, 143, 145, 148, 150); 'knotted strip roulette' (Mayor *et al.* 2005, figs 4, 6, 10, 11).

Tyi, Bandiagara, Mali, end of the sixteenth-mid twentieth centuries AD
'Scoubidou cylindrique simple', 'scoubidou cylindrique alterne' (Huysecom *et al. in press*, fig. 55).

Central Mali, second century AD onwards
'Braided strip roulette impression' (Mayor, *in press*, fig. 9, bottom).

Toguere Galia, Mali, eleventh-sixteenth centuries AD
'Roulette de cordelettes à brins tressés' (Bedaux *et al.* 1978, 136, fig. 25).

Sites in the vicinity of Ségou, Mali, AD 1400–1850 (based on C^{14} dates and historical context)
'Scoubidou' or 'braided strip roulette' (Kevin MacDonald, pers. comm.; MacDonald and Camara *in press*).

Sources of confusion

Impressions of braided strip roulettes can easily be confused with impressions of a four-strand knotted strip roulette, as made experimentally by de Meulemeester (1975)

to interpret one of the decorative types present at the site of Kororofa (Nigeria) (he was probably inspired by publications on the making of 'scoubidous' popular in the 1960s, see. e.g. http://www.scoubiguide.co.uk/circle.html). However, the impressions generated by this experimental roulette show diagonal grooves that are so close to one another that they touch and lose some of their stepped appearance. As discussed above, de Meulemeester's work was used by Bedaux *et al.* (1978) to interpret comparable (but rare) impressions at the site of Toguere Galia (Mali), then by Desmedt (1991) to interpret similar motifs featuring on pottery from Muzenga and Gisagara, in Rwanda. Nevertheless, that experimental knotted tool has seemingly never been observed ethnographically, whereas the braided strip roulette is known among several populations, for example in Nigeria, Burkina Faso and Mali (see Section 1, this volume). Moreover, the archaeological pottery published in the three articles referring to this experimental roulette could very well have been made using instead a tightly-braided strip roulette. Therefore, whilst awaiting new field data, we question the validity of this reconstruction.

A second source of confusion often occurs with twisted cord impressions, which present the same parallel diagonal grooves as do braided strip impressions, but these are separated by lines of rounded scallops which were made by the segments of the cord. On abraded sherds, or with an inexperienced eye, it is easy to confuse the two patterns (compare for example Figure 3.48 or 3.49 below with Figure 3.3 in Arazi and Manning, this volume).

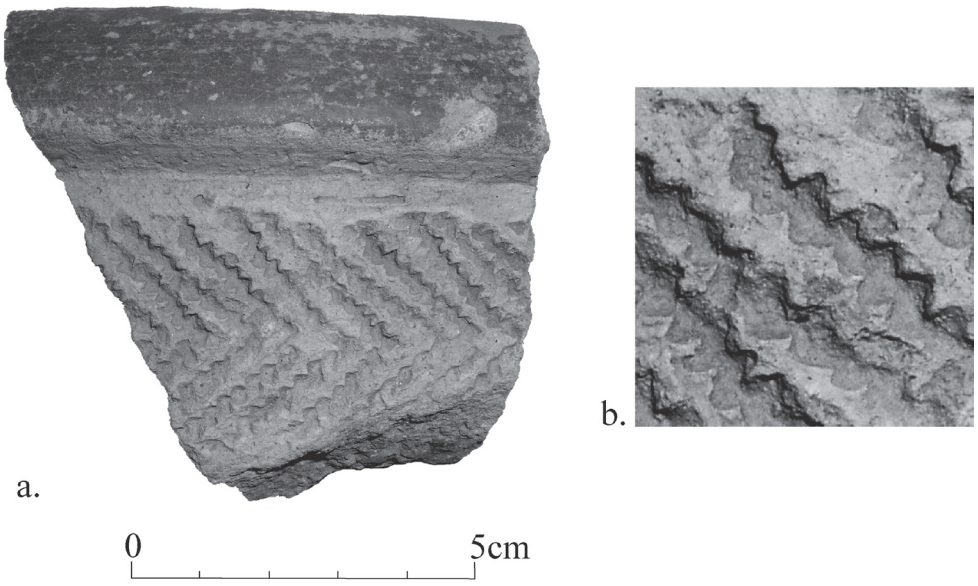

Figure 3.46. Sherd recovered from excavations at Sagourou, Séno Plain, Mali, late first millennium AD. The body bears impressions of a rolled alternately-braided strip roulette. Photo: Anne Mayor.

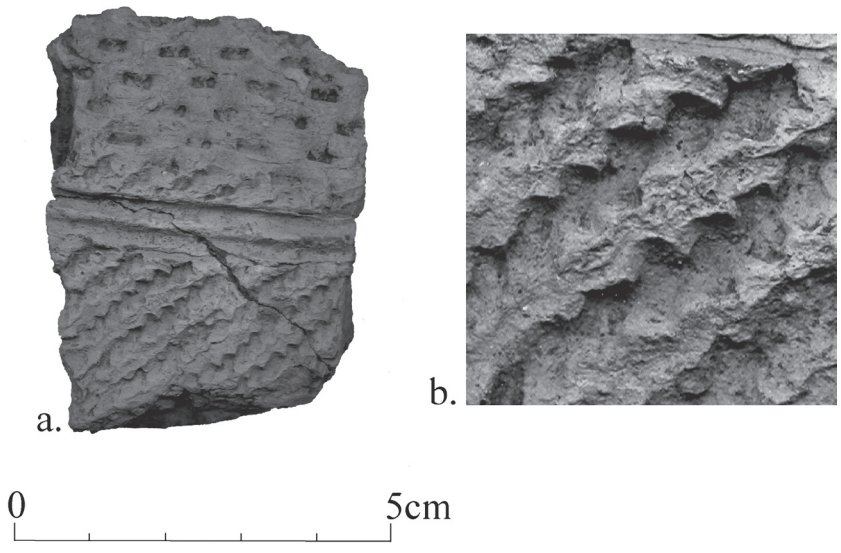

Figure 3.47. Sherd recovered from excavations at M'Peba, Mali, AD 1800–1900. The body bears impressions of a rolled blepharis stalk, underlain by a simple incision and rolled braided strip roulette. Photo: Kevin MacDonald.

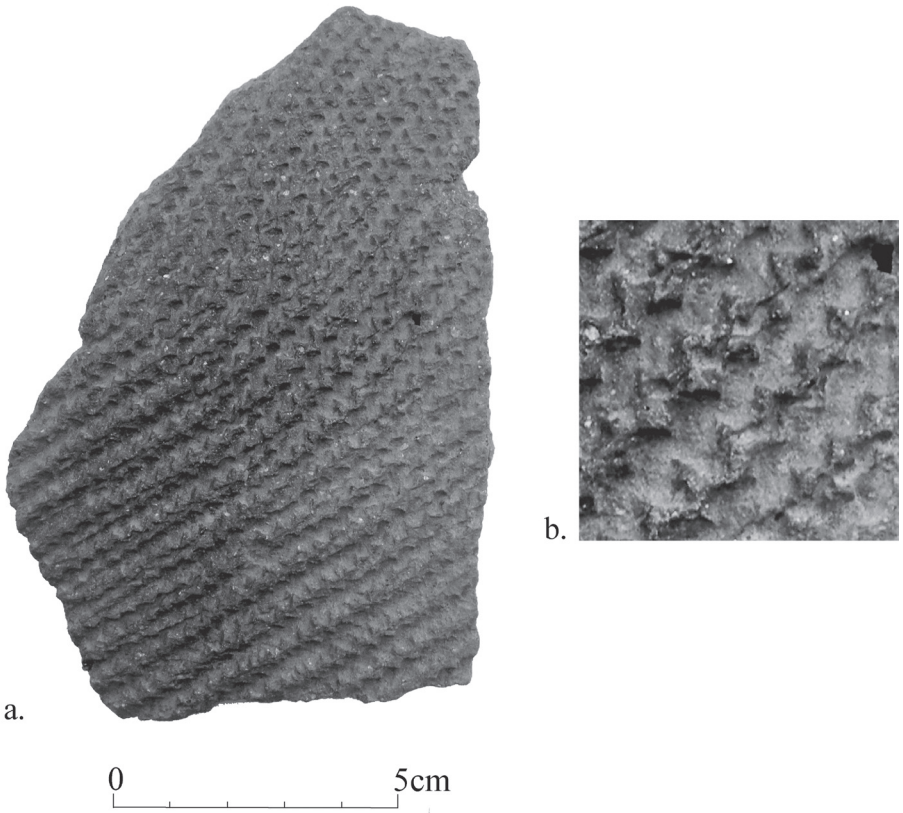

Figure 3.48. Sherd recovered from excavations at the protohistoric site of Birifoh (SiLayiri), northern Ghana. The body bears very clear impressions of a braided strip roulette. Photo: Malik Saako Mahmoud.

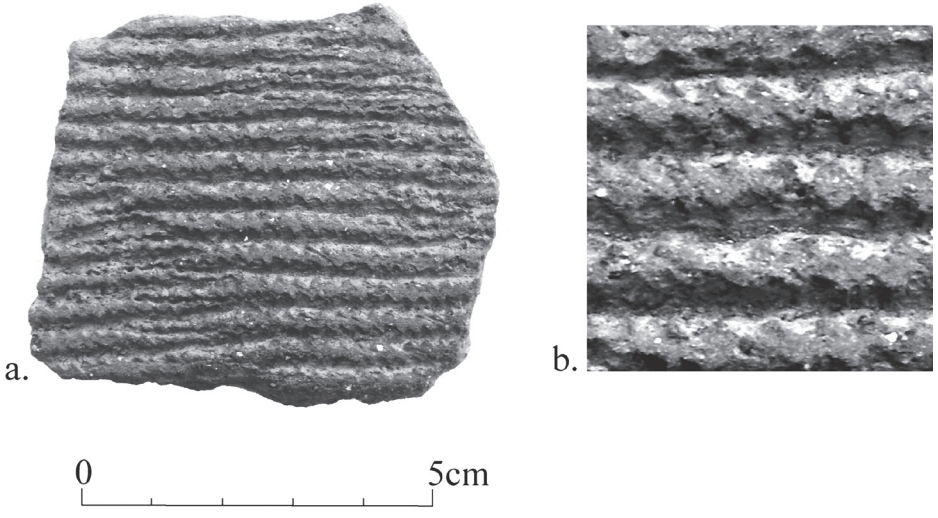

Figure 3.49. Sherd recovered from excavations at the protohistoric site of Birifoh (SiLayiri), northern Ghana. The body bears impressions of a braided strip roulette. Photo: Malik Saako Mahmoud.

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Glossary / *Glossaire*

Generalities / *Généralités*

Roulette: a pottery-decorating tool, which can be either rolled or impressed in diverse manners onto the wet surface of a clay vessel during its fabrication.

***Roulette**: un outil pour la décoration de la poterie, qui peut être roulé ou imprimé de diverses manières sur la surface encore humide d'une poterie en cours de fabrication.*

Composite tool: in Soper's (1985, 39) definition, this is a tool comprised of a core, which can consist of one or several elements and may be either flexible or rigid, and a subsequent flexible material (e.g. twisted fibres or wire) that can be wrapped, braided or knotted around the central core. The term 'composite' thus refers to the usage of two or more different *elements*, rather than different *materials*. Examination of ethnographic materials allows a finer analysis, focusing, for example, on whether the core and the wrap are in fact made of the same strand (continuous core) or not (discontinuous core); see Section 1 on this.

***Outil composite**: suivant la définition de Soper (1985, 39), il s'agit d'un outil qui consiste en un ou plusieurs éléments centraux (souples ou rigides), autour duquel un matériau flexible (par exemple des fibres ou un fil métallique) est ensuite enroulé, tressé ou noué. Le mot 'composite' fait ainsi référence à l'utilisation de deux ou plus éléments distincts, plutôt que de matériaux distincts. L'examen de matériaux ethnographiques permet une analyse plus fine encore, considérant, par exemple, si l'âme et l'emballage consistent en un même objet (âme continue) ou non (âme discontinue) ; voir Section 1 à ce sujet.*

Material / *Matériau*

Fibre: a blanket term covering flexible materials of vegetal origin (e.g. marsh reeds, cotton).

***Fibre**: un terme général englobant les matériaux flexibles d'origine végétale (p. ex. roseaux des marécages, coton).*

Round fibre: fibre with a circular cross-section. Very frequently in roulette fabrication, such round fibres are combined by twisting to make up a cord, but they are occasionally also used in their loose, untwisted form (see e.g. Hurley 1979, cord 215).

***Fibre ronde**: fibre de section ronde. Les roulettes font fréquemment intervenir une cordelette faite en torsadant des fibres ; cependant, des fibres peuvent aussi être utilisées sans torsion (voir p. ex. Hurley, 1979, Corde 215).*

Flat fibre: fibre with sub-rectangular cross-section. Also known as a 'strip'.

***Fibre plate**: fibre de section quadrangulaire mince. En anglais connu aussi sous le nom de 'strip'.*

Cord: a length of material made up of entwined twisted fibres.

***Cordelette**: une longueur de matériau faite de fibres torsadées.*

Segment: A unit of impression relating, in the case of round fibres, to one revolution of a strand making up a cord (after Hurley 1979, 6). Collectively, the segments form the acting part of a cord-based roulette.

***Segment**: Une unité d'impression qui, dans le cas de fibres rondes, ressort d'une révolution d'un brin constituant une corde (après Hurley 1979, 6). Collectivement, les segments forment la partie agissante d'une roulette à base de cordelettes.*

Acting part: the portion of the roulette which makes contact with the clay and impresses it.

***Partie agissante**: la partie de la roulette qui entre en contact avec l'argile, et crée une impression.*

Bead: A division within the segment of a cord, representing one of its component strands (Hurley 1979, 5). Often, individual fibres are visible within a bead.

***Toron**: Une division interne d'un segment d'une cordelette, représentant l'un de ses brins constitutifs (Hurley 1979, 5). Souvent, des fibres individuelles sont visibles dans le toron.*

Cluster: a group of morphologically characteristic impressed units within an impression. The reoccurrence of the same cluster of units over a decorated surface can serve as a diagnostic for the usage of a roulette (see Section 2).

***Groupe**: un groupe d'unités imprimées morphologiquement caractéristiques au sein d'une impression. La réoccurrence d'un même groupe d'unités sur une surface décorée peut servir de diagnostic pour l'usage d'une roulette (voir Section 2).*

Manipulation / *Manipulation*

Braiding

The technique of braiding involves bringing individual strands successively over one another. It requires a minimum of three strands, which distinguishes it from folding.

Braid and plait are synonyms.

Tresser

Dans la technique du tressage, des brins indépendants sont ramenés successivement l'un sur l'autre. Elle nécessite au moins trois brins, ce qui la distingue du pliage.

À noter que les deux termes anglais 'braid' et 'plait' sont les synonymes qui se traduisent tous deux par 'tresse' ou 'tresser'.

Folding
Requires two strands. These two strands can consist of lengths of the same single fibre (for instance, a single fibre doubled up to form two strands which are then folded over one another).

Fold and pleat are synonyms.

Plier
Cette technique consiste à plier et rabattre une fibre sur l'autre. Elle nécessite un minimum de deux éléments, qui peuvent consister en deux sections d'une même fibre (à savoir une fibre pliée en deux pour former deux longueurs, qui sont ensuite repliées l'une sur l'autre).

À noter que les deux termes anglais 'fold' et 'pleat' se traduisent tous deux par 'pli' ou 'plier'.

Knotting
The technique of knotting involves looping individual strands both under and over each other. The process of knotting can be distinguished from braiding by the fact that loops are created during the work, through which the active strand is passed.

Nouer
Cette technique consiste à former une boucle dans les brins individuels en les passant à la fois en-dessus et en-dessous l'un de l'autre. La technique se distingue du tressage par le fait qu'une boucle est formée à chaque étape, à travers laquelle on fait ensuite passer le brin actif.

Twisting
The technique of twisting two or more strands of fibre to create a single strand. Hurley (1979, 8) noted that a cord's natural tendency to unravel can be counter-acted by using the principle of opposing forces, taking two individual strands with the same direction of twist and combining them using the opposite twist.

Torsader
Cette technique consiste à opérer un mouvement de torsion à deux brins ou davantage afin d'en faire un brin unique. Hurley (1979, 8) précise que la tendance innée d'une corde à se dérouler peut être contrecarrée en utilisant le principe des forces opposées, à savoir en utilisant deux brins qui ont la même direction de torsion et en les combinant avec un mouvement de torsion dans le sens opposé.

Action / *Action*

A roulette is most often rolled, but it can also be single-impressed, pivoted, or rocked.

Une roulette est le plus souvent roulée, mais elle peut aussi être imprimée simplement, pivotée, ou basculée.

Roll: the action of moving an object forward along a surface by revolving it around its lengthwise axis.

***Rouler**: l'action qui consiste à faire avancer un objet le long d'une surface en lui appliquant une rotation autour de son axe le plus long.*

Single impression: *impression simple.*

Pivot: the action in which one end of a roulette is kept in one place while its length is impressed in any one direction; this movement is repeated in successive motions. The centre of gravity in a pivoting motion is at the extremities of the roulette.

***Pivoter**: l'action par laquelle une extrémité de la roulette reste immobile pendant que sa longueur est imprimée dans une direction donnée; ce mouvement est ensuite répété de manière successive. Le centre de gravité lors d'un mouvement de pivotage se trouve aux extrémités de la roulette.*

Rock: the action by which the length of a roulette is impressed in any direction and the movement repeated to create slightly oblique rows of impression. The centre of gravity in a rocking motion is in the centre of the roulette – which distinguishes it from the pivoting movement.

***Basculer**: l'action par laquelle la longueur d'une roulette est imprimée dans une direction donnée, et le mouvement ensuite répété pour créer des rangées légèrement obliques d'impressions. Le centre de gravité lors d'un mouvement de basculement se trouve au centre de la roulette – ce qui distingue cette action de celle du pivotage.*